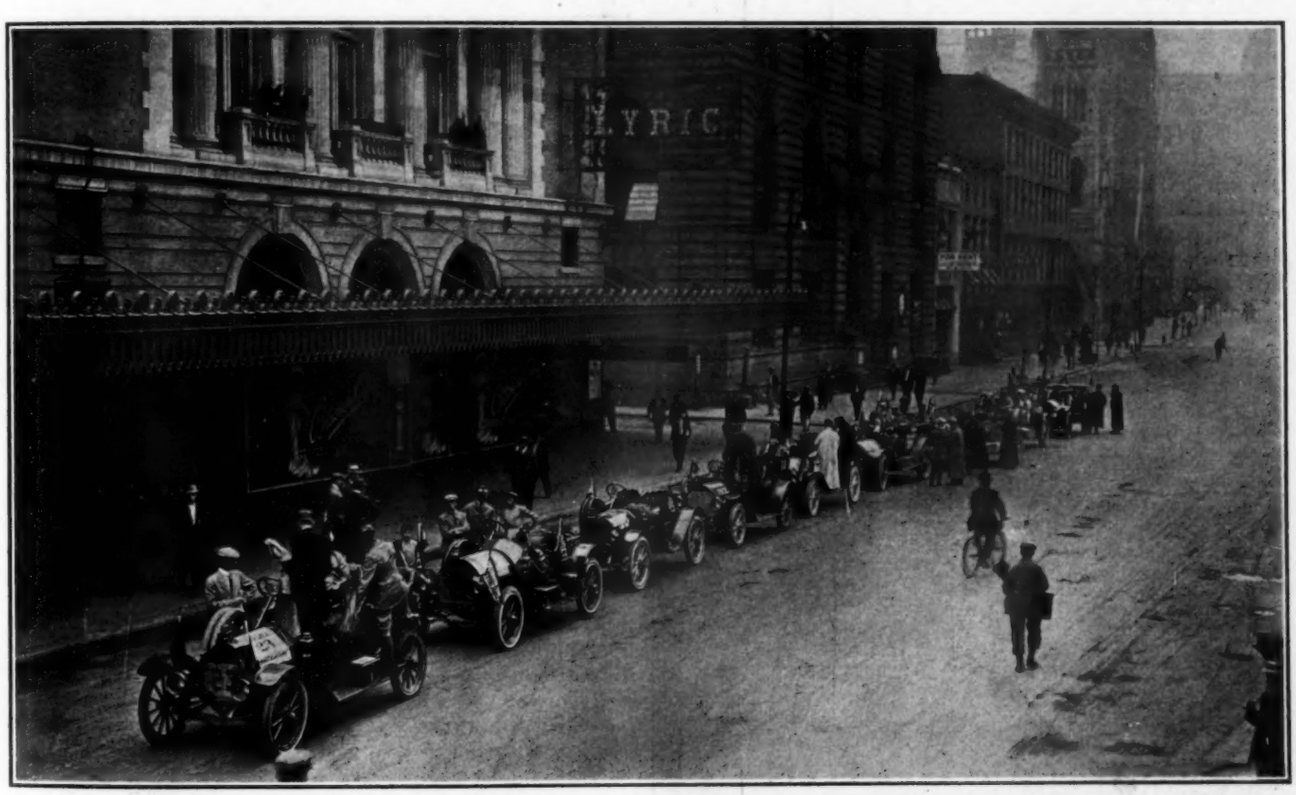
VOL. XXIII NEW YORK—THURSDAY, AUGUST 18, 1910—CHICAGO No. 7

THE AUTOMOBILE

Munsey Tour Starts

MOST IMPORTANT RELIABILITY CONTEST OF THE YEAR OFF ON ITS LONG JOURNEY THROUGH TEN STATES—28 CONTESTANTS AND 8 OFFICIAL CARS IN THE LINE-UP

PHILADELPHIA, Aug. 16—With a typical field of starters in the contesting division, the Munsey Historic Tour of 1910 commenced its long grind of 1,550 miles this morning from Philadelphia. Twenty-three different makes are represented and the cars are running in six divisions under the regular price classification.



THE CARS LINING UP ON NORTH BROAD STREET FOR THEIR 1600-MILE JOURNEY

The route to be followed has been laid out to cover points of historic interest through the scenes of Revolutionary and earlier struggles in the annals of the United States, as well as touching the great battleground of the Civil War at Gettysburg and some of the places made famous by the conflict of 1812, finishing at Washington on Aug. 27.

The first day's run from Philadelphia to West Point was 160.1 miles, requiring 8 hours running time for the larger cars. The course was over the Old York Road, over which the British troops dashed when Washington met his severe check at the battle of Germantown. Passing through Ogontz, Bustleton, La Trappe and Oxford Valley, the tourists reach Trenton and for a part of the journey follow the path taken by Washington when he surprised the Hessians at Trenton and afterward moved swiftly upon the detachment entrenched at Princeton. From the scene of these two victories for the patriot arms, the course lies along the identical road taken by Washington in reaching Morristown.

A considerable portion of the road going into that place and leaving it was built by the Continental soldiers during the winter that followed the actions at Trenton and Princeton. History says that Washington experienced much trouble in keeping his men busy in winter quarters, and in his wisdom he ordered them to build roads and other strategic and engineering works

rather than lie idle and plot mischief. In this way certain sections that were occupied by the Continental forces during the war, received the impetus always given to communities by the possession of good roads.

From that point clear to the New York State line the way lies through a series of roads that antedate the Revolution.

Starter Newmyer, Referee Ferguson, and Hemstreet, Tracy and McMurtry, the "technical" sharps

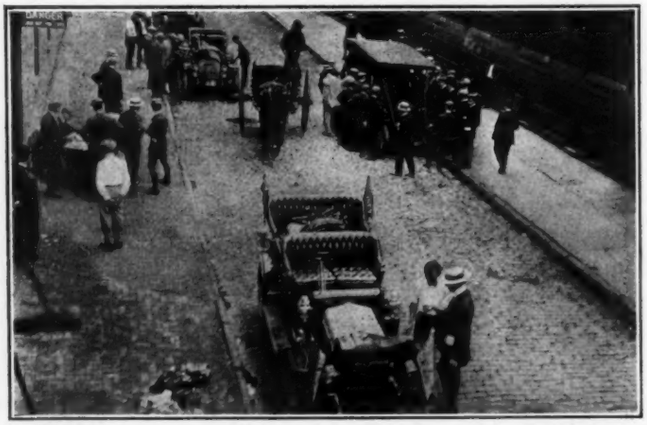
Scarcely a mile is passed that does not contain some point of historic interest; either an ancient dwelling that once sheltered the Commander-in-Chief or the site of a block-house or little fort that was the scene of desperate conflict.

After entering New York State, the course of the tour is even more interesting for it traverses hallowed ground for much of its distance. Stony Point, where "Mad" Anthony Wayne and his band captured a British stronghold with the bayonet, is one of the features and West Point, once considered the Gibraltar of America and now the seat of the National Military Academy, was the objective point of the day.

The day broke gray and cloudy with prospect of more rain, but the tourists were astir early and sharply at 7 o'clock the first of the cars was sent away.

The officials in charge of the run have been preparing for it for several weeks and as a result every item of detail was carefully arranged in advance. There was no confusion or hurry or tangle and everything moved with the precision of clockwork.

The tour is the second annual of the Munsey newspapers. Last



Preliminary inspection of the cars by the Technical Committee

year there was more or less informality about the run; laxity in the administration of the rules and a general tendency to mix pleasure with business to an undue degree. This year, however, the affair is being conducted on a plane with which no fault may be found on that score.

The most searching technical examination was imposed upon the contestants by a committee consisting of E. L. Ferguson, Joseph Tracy and J. A. Hemstreet, which was supervised by Alden L. McMurtry, of the Automobile Club of America. So strict was this examination that three cars failed to qualify and two were allowed to start only after special investigation.

The route to be followed is in no way comparable to that of the recent Glidden Tour. The Munsey Tour runs through a civilized country all the way. There are no such bogs and neglected highways as were found in North Alabama and no such desperate trails as the one that led into Texarkana and through Oklahoma. There are some pretty tough spots in the Munsey itinerary, but nothing like those encountered in the Glidden. Practically from the start to the finish, the tourists will be within hailing distance of populous and prosperous communities in which the automobile already is held in affectionate regard.

Only three 1911 models are in the caravan, although a dozen of the contestants are of almost identical patterns with the models for the coming year so far announced by their manufacturers. The avowed 1911 models are the Crawford, Inter-State and Kline-Kar, all the others being of the current year.

Following a banquet Monday night at the Hotel Walton for those who are participating in the tour, E. L. Ferguson, referee, announced a new system of checking and daily scoring that is intended to do away with much of the annoyance and delay that have been experienced in other runs. The crew of each car is furnished with a book of blank forms containing spaces for car

Columbia, No. 2, with G. M. Wagner at the wheel

number, division and day. Then follows a skeleton of both morning and afternoon schedules with the starting time, running time, tire time, allowances and time due to arrive at each control. Opposite to these sections is a space for the observer to note the happenings of the day and attached to this blank is the driver's time card, which cross checks against the observer's record. In this card, space is left for the starter to note the time of beginning the run, the rate of the running time, and for the checker to note arrival at controls. Both of these sections must be handed in at the end of each day and obviously must check with one another.

Mr. Ferguson and the officials hope that an extra degree of promptness can be attained in making up the daily records of penalizations by following this system.

The rule about a car carrying its advertised capacity load has been strictly enforced and those that do not carry as many passengers as might seem to be required have large bags of sand stowed away to make up the legal weight.

The technical examination was decidedly severe. The tread of every machine was measured. The height of the frame from the axle was accurately ascertained. The springs were measured in a most thorough manner, both the width of the leaves and the thickness of the leaves being taken into consideration, and the springs were afterward counted, the whole operation being attended to strictly to make certain that the springs are the springs

of the stock certificates and not taken from a heavier model. The distance from the front axle to the end of the front springs was measured to see that the springs do not shift back and forth. Three men were constantly engaged in taking these measurements to check up the makers' certificates.

While this work was going on another man was checking up the spare parts, putting them in bags and sealing them up. Other measurements were also taken. The diameter and length of the spokes were ascertained, and the floor boards and hood covering were removed and an inspection made of the power plant. All the information obtained was carefully jotted down, and the finished page was signed by the driver and the representative of the entrant, so that no dispute could possibly arise.

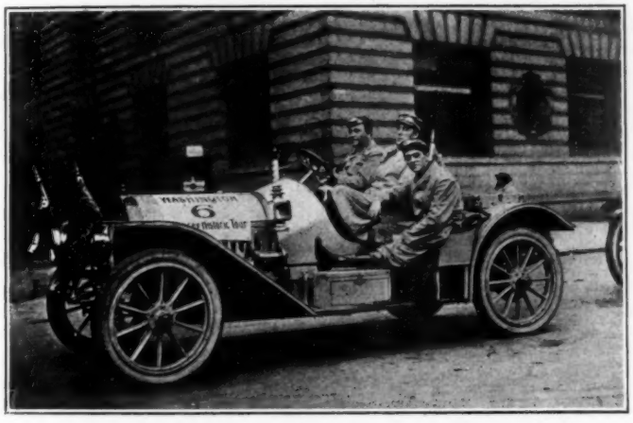
The official cars include the following:

Car	Entrant	Use
Columbia	Columbia Mot. Car Co.	Pacemaker
Thomas	E. R. Thomas M. C. Co.	Press
Washington	Carter Mot. Car Co.	Press
E-M-F	E-M-F Co.	Press
Selden	Selden Mot. Veh. Co.	Pilot
E-M-F	E-M-F Co.	Pilot
Ohio Roadster	Ohio Motor Car Co.	Starter
Brush	Brush Runabout Co.	Photographer

A Randolph truck carries the baggage as a non-contestant.

Under the schedule arranged divisions 4, 5 and 6 must make 20 miles an hour; divisions 2 and 3, 18 miles an hour and division 1 is required to do 16 miles an hour.

The complete list of the officials in charge is as follows: E. L. Ferguson, referee; Technical Committee, E. L. Ferguson, Joseph Tracy and J. A. Hemstreet; Arthur G. Newmyer, starter and chief observer; A. J. Irvin, assistant starter and chief observer; Harry Ward, pilot number 1; M. M. Mauger, pilot number 2; J. A. Hemstreet, noon checker; T. C. Willis, checker-in and advance man; Francis J. Byrne, press representative and Olin W. Kennedy, manager for the Munsey newspapers.



One of the Washington pair—W. D. Arrison driving

The day was remarkable for careful driving, every man at the wheel taking no chances for getting points against his machine. Although the pacemaking car was well in advance of the contestants, there was no effort on the part of the cars to pass each other at high speed, every one being content to keep well to his time limit.

The ferry at West Point, which it was thought would offer some difficulty, was easily manipulated. Arrangements were made to have all the cars ferried over, and this was done before 7 o'clock. Through the kindness of L. Lawson of Garrison, N. Y., a fine place was secured to park the cars in front of the station, but a short walk from the ferry.

The greatest enthusiasm exists among all the men in regard to making perfect scores, all recognizing that a good showing in this tour means glory for their cars.

The scores of the day's run were posted on the official bulletin board at 8 o'clock to-night.

As soon as the data were collected this evening Referee Ferguson summoned the officials of the tour to his room and at once made out the reports so that the men could see them in plenty of time and avoid the irritating delays in posting scores which have marred so many tours.

The observers' assignments for the next day were also given out and the other business of the tour despatched early. This thorough method of handling the official business of the tour on the very first day made an agreeable impression on the contestants.

Last year's winner, Frank Hardart, and his new Elmore

The official cars of the tour maintained their reputation for good work. The E-M-F pilot car carried the confetti men along the route in fine shape. In spite of the fact that the car shifted off the track several times because of bad directions, it was always able to regain the right course and hold its distance well in the lead without ever being sighted by the other machines.

The Selden pilot car did the work for which it was called on flawlessly, covering a score or more of miles more than were scheduled and still scattering confetti well in advance of the contestants.

The Columbia pacemaker car and the Washington and E-M-F press cars carried the newsmen of the trip through the entire journey in speedy time, running back along the route whenever it was necessary and still covering the course with the contesting cars.

The only untoward incident that occurred during the day happened when the Ohio car was midway between Morristown, N. J., and West Point. A passing team became frightened and plunged into the machine which Ross Henwood, the driver, had brought to a standstill. Two women occupants of the carriage were badly frightened, and the carriage was damaged.

Warren-Detroit, No. 10, a candidate for Class 3A honors

The starters' car came up at that moment and drove the women

to their home, nearby, afterwards assisting in taking the carriage to a neighboring blacksmith shop. The owner of the carriage refused to accept any money compensation for the injury done.

Every arrangement which had been made for the handling of the contesting cars en route and the performance of official duties has been found to work out well in practice.

The plan to carry a checker along with the pilot car and then to drop him at the noon control so that he could check in the machines has met with general satisfaction and has resulted in carrying on the business of the tour splendidly. The noon checker is picked up by the last press car and brought into the night control.

The Bay State Automobile Club, of Boston, will have several representatives to go over the road to Providence to meet the tourists and escort them to the Hub.

The selection of the Hotel Lenox as headquarters for the tourists is especially pleasing to the Bay Staters for they have just opened their new rooms there and will give the tourists, during their brief stay, the freedom of the place.

The club is especially well located, its rooms being on the Boylston street side and on the ground floor.

The complete itinerary of the tour follows:

August 16 from Philadelphia to West Point, N. Y.	160.2
August 17 from West Point to New London, Conn.	167.8
August 18 from New London to Boston, Mass.	117.2
August 19 from Boston to Portland, Me.	140.8
August 20 from Portland to Bethlehem, N. H.	122.7
August 21 (Sunday) Lay-over at Bethlehem, N. H.	
August 22 from Bethlehem to Burlington, Vt.	102.8
August 23 from Burlington to Saratoga, N. Y.	200.5
August 24 from Saratoga to Binghamton, N. Y.	164.7
August 25 from Binghamton to Wilkes-Barre, Pa.	98.5
August 26 from Wilkes-Barre to Harrisburg, Pa.	115.8
August 27 from Harrisburg to Washington, D. C.	159.3
Total Mileage	1,550.3

West Point, N. Y., Aug. 16—Under leaden skies the first day's run of the Munsey Historic Tour of 1910 was run off. A severe shower soaked all hands during the morning, but proved not to be of sufficient weight to make the roads muddy. This is due in large part to the fact that the rain fell in a circumscribed area of New Jersey, where the roads are largely made up of stone or well-kept macadam. All day the threat of more rain was impending, but it did not materialize.

The roughest spot in the entire itinerary of the day was a mile within the limits of Philadelphia, where the asphalt pavement had been suffered to deteriorate and was filled with back-breaking chuck-holes. Next to that terrible stretch of street, a hill paved with cobblestones "au naturel," the edges of the living rock, made many of the tourists wonder why they had undertaken the trip. But these difficulties were easily surmounted by all the entered cars, and it was a 30 per cent. grade, twenty miles south of West Point, that caused the most trouble. The Thomas press car, the same machine that made the world-girdling tour some time ago, was the principal sufferer. The car was ditched half-way up the hill and the whole crew consisting of two newspapermen, passenger and driver were shaken up. None of the injuries to the members of the crew proved to be of moment. The car, however, was laid out on the hill all night.

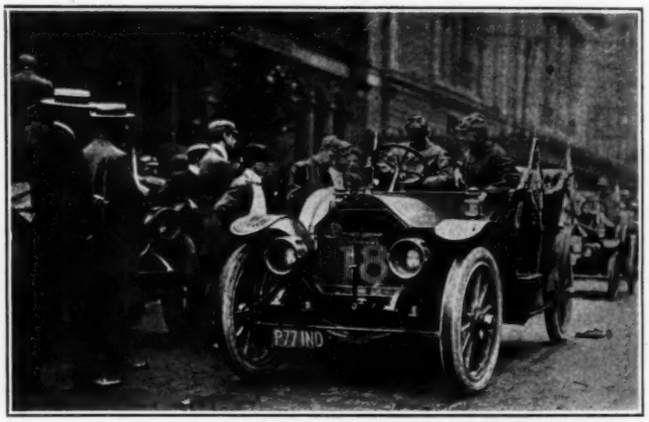
The Inter-State entry was the real sufferer as the result of the day's work as its crew was obliged to put in 46 minutes examining the vitals of the car before it was discovered that a soft steel bolt had been ground up in the transmission and was lodged in the teeth of the gears. I. W. Dill, driver, intimated broadly that the presence of the soft steel bolt was entirely unknown to him and stated that he believed it was put where it would do damage by some malicious person.

Aside from these incidents the day proved an excellent test for both cars and crews.

Arriving at West Point, the tourists witnessed a dress parade of the cadet corps before dinner.

The new scoring plan of Referee Ferguson demonstrated its merit and the complete technical and road showing of all contestants was announced early in the evening.

Only two out of the twenty-eight starters suffered penalties on account of the first day's run. These were Brush Runabout, No. 13, which received three demerits for an involuntary motor stop, and Inter-State, No. 29, which was penalized 46 points for 46 minutes' work in discovering the broken bolt in the transmission and the further penalty of 3 points for taking on lubricating oil out of control—a grand total of 49 demerits for the day.



Great Western, No. 18—C. LaMar—a 3A entry that looks good

The eight-mile-an-hour speed regulation of the military reservation resulted in the arrest of the crew of the pacemaking E-M-F car. The crew of the Corbin were also given a warning. The E-M-F car was summarily banished from the reservation.

The Munsey Historic Tour of 1910 is the second annual automobile reliability event of national importance promoted under the auspices of the Munsey papers—The Washington *Times*, the

Regal Plugger, Class 3A, driven by A. W. LaRoche

Louis Strang and the Pierce-Racine, out for the Class 4A trophy

K. Crittenden's K-R-I-T, contesting for the small car emblem

Ohio, No. 21, looked upon as a possibility for Class 4A prize

Baltimore *News*, the *Evening Times* of Philadelphia and the Boston *Journal*. The Munsey Tour of 1909 from Washington to Boston and return was eminently successful. This year's route is longer than that of 1909, covering 1,550.3 miles. Starting from Philadelphia the course runs to West Point, N. Y., New London, Conn., Boston, Mass., Portsmouth, N. H., and Portland, Me., then through the White Mountains and Green Mountains to Burlington, Vt., and to the Isle La Motte in the upper reaches of Lake Champlain. The course from there is through Plattsburg, Saratoga, Binghamton, Wilkes-Barre, Gettysburg, Frederick and Baltimore, ending in Washington at the office of the Washington *Times*.

Glide, No. 28, Fred Cassel driving, a strong Class 5A probability

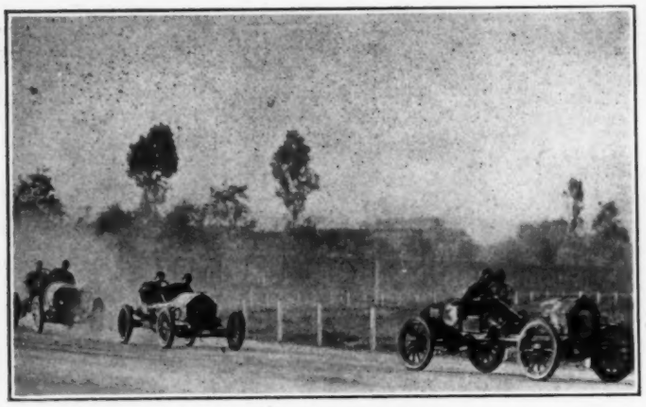
Twenty Clean Scores in Brooklyn Dealers' Run

Official announcement of the road work performed by the cars that competed in the two-day reliability contest of the Brooklyn Motor Vehicle Dealers' Association last week was made Saturday by Referee A. R. Pardington. Twenty out of the thirty cars that started finished with perfect scores, as follows:

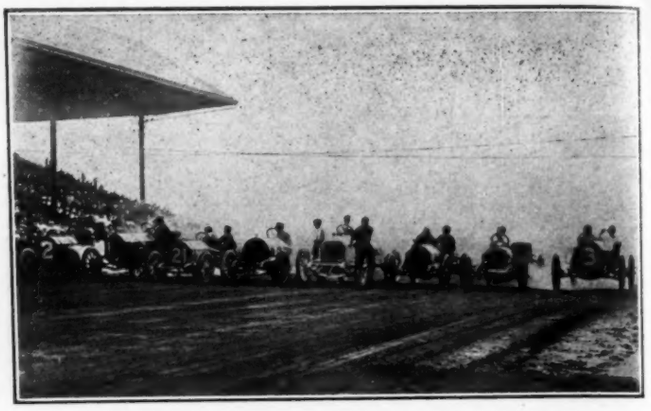
No.	Car	Driver
1	Columbia	I. C. Kirkham
2	Haynes	L. A. Rourk
3	Locomobile	P. Mahoney
4	Hudson	W. H. A. Bruns
6	Inter-State	H. G. Martin
7	Stevens-Duryea	P. J. McDermott
8	Maxwell	E. T. Bloxham
11	Winton	William Braden
12	Auburn	Jacob Stark
16	S. G. V.	J. W. Mears
17	E-M-F	F. A. Ainslee
18	Kline	C. Smith
19	Speedwell	Arthur Gross
21	Columbia	G. M. Wagner
22	Chalmers "30"	Emil Fiedler
23	Midland	Leo Anderson
24	Haynes	R. Smidt
25	Maxwell	C. Fleming
26	Crawford	W. J. Houldcroft
30	Pullman	Ellis Kulp

DETAILS AND DAILY PENALIZATIONS OF THE 28 CARS WHICH STARTED ON THE MUNSEY HISTORIC TOUR

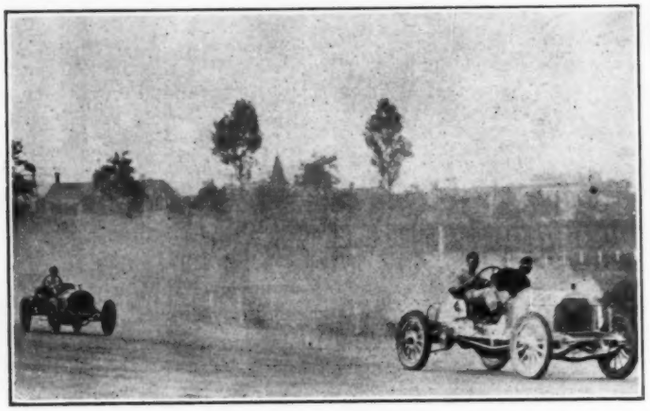
No.	Car	No. Cyl.	A.L.A.M. H.P.	Cyl. Bore	Piston Stroke	Car Model	Entrant	Driver	Price	Ignition	Tires	No. Pass.	Body	Penalties 1st day	Penalties 2d day
CLASS 1A—CARS SELLING UNDER $800															
13	Brush	1	6 2-5	4	5	D	Frank Briscoe	E. McCoy	$ 485	Bosch	Ajax	2	Runab't	3	...
14	Brush	1	6 2-5	4	5	D 26	Frank Briscoe	P. R. Kenny	600	Bosch	Ajax	2	Runab't	...	...
19	K-R-I-T	4	21	3 5-8	4	A	K-R-I-T Mot. Car Co.	K. Crittenden	800	Bosch	Diamond	2	Runab't	...	...
CLASS 2A—CARS SELLING FROM $801 TO $1,200															
8	Ford	4	22 1-2	3 3-4	4	"T"	Chas. E. Miller & Bro.	C. E. Miller	900	Ford	Firestone	2	Roadst'r	...	...
26	Maxwell	4	22 1-2	3 3-4	4	"Q"	Max. Briscoe M. Co.	C. F. Fleming	900	Splitdorf	Ajax	2	Runab't	...	...
30	Ford	4	22 1-2	3 3-4	4	"T"	Ford Motor Co.	F. K. Peabody	825	Ford	Firestone	2	Runab't	...	...
34	Ford	4	22 1-2	3 3-4	4	"T"	Ford Mot. Co. (Phil.)	J. A. Cherry	825	Ford	Goodrich	2	Roadst'r	...	...
CLASS 3A—CARS SELLING FROM $1,201 TO $1,600															
10	Warren-Detroit	4	25 3-5	4	4 1-2	A 108	Taylor Mot. Dis. Co.	Tom Berger	1,250	Bosch	Firestone	4	D. Ton.	...	...
15	Regal	4	25 3-5	4	4	E	Regal Motor Co.	A. W. La Roche	1,250	Remy	Empire	2	Runab't	...	...
18	Great Western	4	28 9-10	4 1-4	5	"30"	G. W. Auto Co.	C. La Mar	1,600	Remy	Goodrich	5	Touring	...	...
23	Staver-Chicago	4	25 3-5	4	4	H	Staver Carriage Co.	E. T. Knutsen	1,600	Bosch	Diamond	4	Touring	...	...
25	Maxwell	4	28 9-10	4 1-4	4 1-4	E	Max. Briscoe M. Co.	H. E. Walls	1,500	Splitdorf	Ajax	5	Touring	...	...
27	Crawford	4	28 9-10	4 1-4	4 1-2	1911	Crawford Auto Co.	A. A. Miller	1,450	Remy	Goodrich	4	Touring	...	...
32	Moon	4	28 9-10	4 1-4	5	30	Moon M. C. Co.	R. M. Upton	1,500	Bosch	Firestone	3	Runab't	...	...
CLASS 4A—CARS SELLING FROM $1,601 TO $2,000															
5	Washington	4	27 1-8	4 1-8	5 1-4	C 40	Carter Mot. Car Co.	A. A. Carter	1,750	Bosch	Republic	2	Runab't	...	...
6	Washington	4	27 1-4	4 1-8	5 1-4	C 40	Carter Mot. Car Co.	W. D. Arrison	1,750	Bosch	Republic	2	Runab't	...	...
16	Pierce-Racine	4	28 9-10	4 1-4	5	K	Pierce Motor Co.	L. Strang	1,750	Remy	Diamond	5	Touring	...	...
17	Enger	4	30 6-10	4 3-8	4 3-4	"40"	Enger Mot. Car Co.	H. Frisch	2,000	Eisemann	Falls	5	Touring	...	...
21	Ohio	4	28 9-10	4 1-4	4 3-4	40 A	Ohio Motor C. Co.	Ross Henwood	1,850	Splitdorf	Goodrich	5	Touring	...	...
29	Inter-State	4	32 3-5	4 1-2	5	34A 1911	Inter-State Auto Co.	I. W. Dill	2,000	U. & H.	Mansfield	4	Touring	49	...
CLASS 5A—CARS SELLING FROM $2,001 TO $3,000															
2	Columbia	4	32 3-5	4 1-2	4 7-10	48	Col. Mot. Car Co.	G. M. Wagner	2,750	Bosch	Ajax	4	Min. ton.	...	...
9	Elmore	4	32 3-5	4 1-2	4	46	Frank Hardart	A. S. Hardart	2,500	Atwa'r-K	Goodrich	7	Touring	...	...
11	Corbin	4	32 3-5	4 1-2	4 1-4	18	Corbin M. V. Co.	A. T. Bailey	2,759	U. & H.	Diamond	4	Db. rum.	...	...
22	Cino	4	25 3-5	4	4 3-8	A	Haberer & Co.	W. Donnelly	2,250	Remy	Diamond	5	Touring	...	...
24	Stoddard-Dayt'n	4	36 1-10	4 3-4	5	10 K	L. H. Shaab	Leo Shaab	2,750	Bosch	Goodrich	4	Toy Ton	...	...
28	Glide	4	36 1-10	4 3-4	5	Spec. 45	The Bartholomew Co.	Fred Cassel	2,500	Eisemann	Goodyear	4	Touring	...	...
31	Kline Kar	6	40	4 3-32	5	1911	B. C. K. M. C. Co.	C. Fairman	2,700	Bosch	Firestone	5	Touring	...	...
CLASS 6A—CARS SELLING OVER $3,000															
33	Matheson	6	48 3-5	4 1-2	5	18	Math. Mot. Car Co.	D. A. Hall	3,500	Bosch	Firestone	5	Touring	...	...



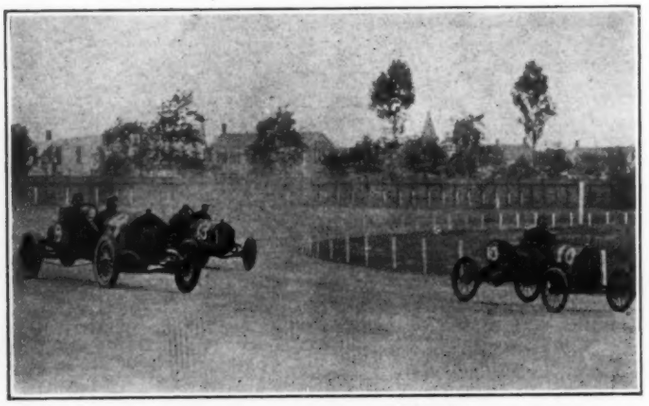
Marion and Stearns passing the Cole "30"



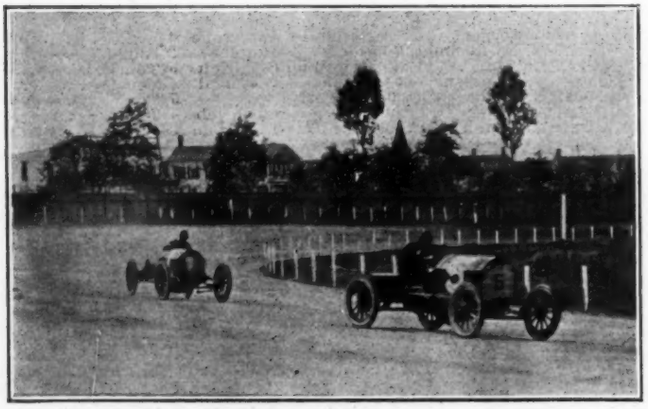
Line-up for the hour race, won by the S. P. O.



S. P. O. No. 17 overtaking the Stearns



National and Palmer-Singer chasing the Ford



Simplex beat the Fiat in both heats of the match race

Brighton Races

S. P. O. AND FORD FEATURES OF A FINE AFTERNOON'S SPORT

FOUR new track records were hung up Saturday at the racing matinée of the Motor Racing Association at Brighton Beach track. The hour mark was set at 59 miles by S. P. O. car No. 20. while the Fiat No. 1 lowered the track record for the mile to 52.26; the five-mile to 4:36.60, and the ten-mile to 9.31.51.

The Simplex "90" administered another beating to the Fiat "60," winning two straight heats after fierce struggles.

The hour race went to the S. P. O. No. 20, which covered 59 miles, the Rainier, No. 15, beating out another S. P. O., No. 17, for the place.

H. M. Swetland acted as referee, while the judges were: J. A. Clark, J. C. Nichols, L. D. Rockwell and George C. John. A crowd of full 10,000 was present. The summaries:

One-Mile Time Trials

	Car	Entrant	Driver	Time
5	Simplex	Simplex Auto Co.	Robertson	52.71
1	Fiat	Fiat Auto Co.	De Palma	54.76

Pursuit Race

10	Ford	Ford Motor Co.	F. Kulick	3:29 4-5
7	Hupmobile	H. J. Koehler Co.	A. C. Dam	
6	Staver	Short & Wright	Chris White	

Ten Miles, Class C, Divs. 1, 2 and 3 C

20	S.P.O.	Henry S. Lake	J. Juhasz	10:40.58
14	Mercer	Mercer Auto Co.	E. H. Sherwood	10:48.88
10	Ford	Ford Motor Co.	Kulick	10:49.22
3	Cole "30"	Colt-Stratton Co.	Endicott	
11	Correja	Correja Motor Car Co.	Joe Taylor	

Ten Miles, Class C, Divs. 4 and 5 C

1	Fiat	Fiat Auto Co.	De Palma	9:31.51
2	Fiat	Fiat Auto Co.	E. H. Parker	
9	National	Poertner M. C. Co.	W. King Smith	

Pursuit Race, Ten Miles

20	S.P.O.	H. S. Lake	J. Juhasz	10:27.87
11	Correja	Correja Motor Car Co.	Joe Taylor	10:39.57
3	Cole "30"	Colt-Stratton Co.	Endicott	10:48.07
21	Marion	C. E. Reiss	Disbrow	

Special Match Race, Three-Mile Heats, Best Two in Three

5	Simplex	Simplex Auto Co.	Robertson	Won straight heats
1	Fiat	Fiat Auto Co.	De Palma	

Time of winner: 2:43.67 and 2:43.41.

Pursuit Race, Ten Miles

9	National	Poertner M. C. Co.	Disbrow	9:55.58
19	Midland	J. M. Boyle	Leo Anderson	10:30.68
2	Fiat	Fiat Auto Co.	Parker	
18	Palmer-Singer	P.-S. Mfg. Co.	Wilson	

Five Miles, Free-for-All

1	Fiat	Fiat Auto Co.	De Palma	4:36.60
9	National	Poertner Auto Co.	Disbrow	5:07.09
10	Ford	Ford Motor Co.	Kiulick	5:22.50

One-Hour Race

20	S.P.O.	H. S. Lake	J. Juhasz	59 miles
15	Rainier	Rainier M. C. Co.	Wally Owen	56 1-4
17	S.P.O.	M. P. Batts	Batts	56 1-8
18	Palmer-Singer	P. S. Mfg. Co.	Wilson	56
4	Stearns	J. Rutherford	Rutherford	55
3	Cole "30"	Colt-Stratton Co.	Endicott	53
21	Marion	C. E. Reiss	Disbrow	51
2	Fiat	Fiat Auto Co.	Parker	48

Checking out from Market Street Ferry, Camden

Checking in at "the half-way point," Hammonton

69 BUSINESS WAGONS CONTESTED IN NORTH AMERICAN'S

Commercial Run

PHILADELPHIA, Aug. 13—Accompanied by an escort of motorcycle policemen, sixty-nine motor trucks of all sizes, powers and types, participated in the *North American's* Motor Commercial Vehicle Run to Atlantic City, which left here yesterday and ended in Camden, N. J., to-day.

The event was as successful as it was unique, and, being the first contest of the kind ever held, attracted a great deal of attention. It was a wholesale demonstration of the remarkable strides that have taken place in methods of transportation. According to the rules governing the contest, each truck was weighed-in, both empty and full, and in order to facilitate matters three weighing-in stations were established in this city and Camden, where the trucks were weighed-in empty on Thursday and then again weighed loaded to capacity on Friday morning, just before their starting time. All sorts and conditions of truck were represented, ranging in capacity from 600 pounds, the smallest, to seven tons. Each truck before starting was allowed only its minimum amount of gasoline in order to propel it to Camden, where each was loaded and where the actual start of the run was made.

The run was in no sense a speed contest, the trucks at all times conforming to the speed rules, the schedule of which was as follows:

GASOLINE

Class A, 1½ tons capacity and less, 15 miles per hour; Class B, 3001 to 5999 pounds, 12 miles per hour; Class C, under four tons, 10 miles per hour; Class C, over four tons, 8 miles per hour.

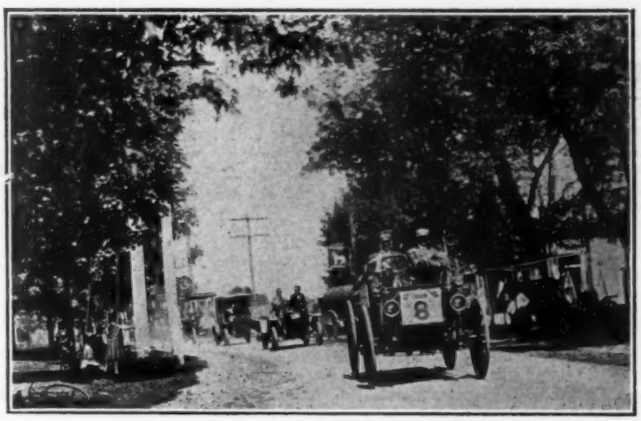
ELECTRIC

Class A, 1½ tons capacity and less, 12 miles per hour; Class B, 3001 to 5999 pounds, 10 miles per hour; Class C, 3 tons and over, 8 miles per hour.

The midway control was established at Hammonton, where each contestant was compelled to make a stop of 15 minutes. Winners of the run will be determined from ability to make time schedule, economy of gasoline, lubricating oil and electric current consumption, and penalties being inflicted for violations of speed rules.

The run down was made by what is called the short route—Camden, Hammonton, Egg Harbor, Absecon, Pleasantville, thence to Park Place, Atlantic City, where the vehicles checked in, right in the heart of the hotel district, and a great crowd gave the contestants a rousing welcome.

Of the 73 original entries but four withdrew, and of the 69 that started 61 completed the entire run. Of the eight that did not finish, five were in Class A and three in Class C. Six of them were from the manufacturers' division and two from the private owners' division.



Passing the White Horse Hotel, Torbensen leading

The big Frayer-Miller checking in at Atlantic City

Reliance, with its big load, reaches the shore

The Autocar had the best representation in line and of twenty cars of this make only one failed to get through. After checking in at Park Place, Atlantic City, the trucks were driven to Young's Million-Dollar Pier, and the exhibition of so many cars of so varied a type attracted a great crowd. Mayor Stoy, of Atlantic City, welcomed the participants last night in Convention Hall.

One of the difficulties feared before the run was held was the effect of the heavily-loaded trucks on the roads, but in spite of the pounding to which the roads were subjected by the weight of the trucks and the tires, some constructed especially for the occasion, no complaints were heard along the route. All of the cars upon their arrival in Camden were found to be in excellent condition.

An unusually large number of press cars accompanied the run, supplied by Automobile Row, consisting of a Welch-Detroit, Premier, Regal, two Buicks, Autocar, Chalmers and Locomobile. The Quaker City Motor Club conducted the event admirably, and, despite the fact that it was an entirely novel affair, everything was carried out with that attention to detail which usually characterizes the Quakers' efforts.

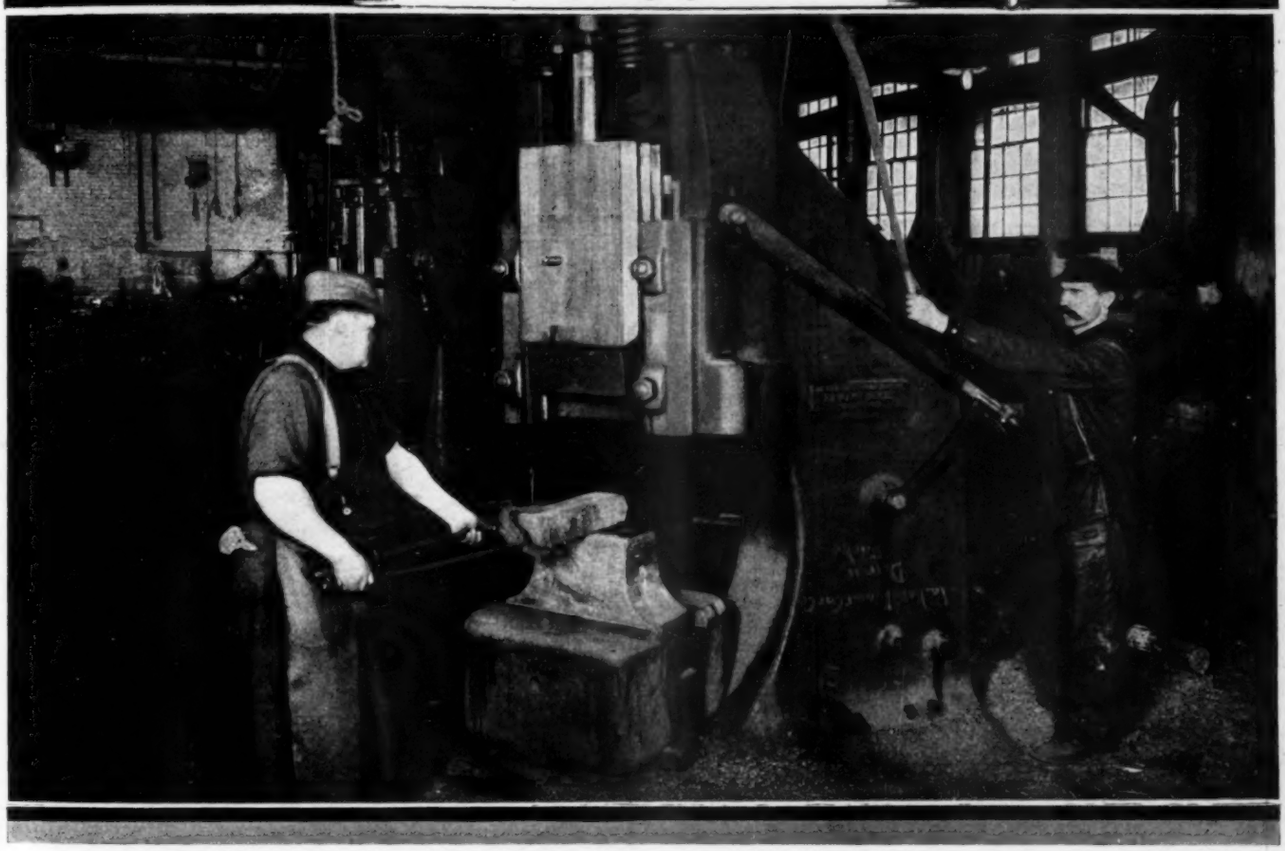
Ten prizes to the amount of $1,000 are to be awarded by the North American, the winners of which will not be announced for several days. Those who had the affair in charge were: Referee, R. E. Ross; starters, G. Hilton Gantert and Joseph L. Keir; chief timer, Paul B. Huyette; members of Quaker City Motor Club's Contest Committee—George M. Graham, Fred. C. Dunlap, A. T. James, A. E. Maltby, Evans Church; chairman of Technical Committee—Charles Stead; judges of weighing-in, Harry C. Volk, Clarence Cranmer, Clyde Woolson; judges, E. K. Leech, Robert M. McCormick, George W. Hipple, H. L. Hornberger, George E. Daniels, H. de B. Keim, J. Archer Paul, E. S. Foljambe, W. C. Jackson, E. H. Lewis.

In reckoning the results, a penalty of 1 point was imposed for every half minute a car was late and awards were based on the ability of cars to make time schedule and for smallest outlay for gasoline, lubricating oil and electric current. The summary:

No.	Car	Entrant	Driver	Time Penalties	Cost per mile per ton
		MANUFACTURERS' DIVISION—Class A (1½ tons capacity and less)			
1	Strenuous Randolph	Randolph Motor Car Company	H. Powers	†	†
2	Chase	Commercial Motor Car Company	C. Trustell	47	$.04173
3	Chase	Commercial Motor Car Company	H. L. Ferris	0	.02618
4	Chase	Commercial Motor Car Company	W. J. Burns	0	.05139
5	Martin	Martin Carriage Works	E. L. Kraft	4	.02775
6	Martin	Martin Carriage Works	J. M. Bowers	†	†
7	Torbensen	Torbensen Motor Car Co.	A. Torbensen	238	.02867
8	I. H. C. Auto Del. Wagon	International Harvester Co	W. A. Bauer	14	.06814
9	I. H. C. Auto Del. Wagon	International Harvester Co.	S. B. Shock	0	.05920
10	Buick	Buick Motor Car Co. (Phila. Branch)	W. Thompson	0	.03354
11	Buick	Buick Motor Car Co. (Phila. Branch)	E. Davis	14	.04377
12	Atterbury	Finnesey & Kobler	M. Kobler	9	.02531
13	Franklin	Franklin Motor Car Co.	W. R. Coughtry	0	*.01285
14	Rapid	Rapid Motor Vehicle Co.	J. Carey	890	.02382
15	Hart-Kraft	Hart-Kraft Motor Truck Co.	R. B. Lawrence	0	.03498
16	Overland	W. J. Sprankle	M. Craig	0	.04141
17	Victor	Victor Motor Truck Co.	C. E. Shaw	0	.01756
18	Grabowsky	Edgar W. Hawley	T. Richings	†	†
		Class B (between 3001 pounds and 5999 pounds)			
50	Garford	Garford Motor Truck Works	W. L. Ritter	0	*.01990
		Class C (between three and four tons)			
56	Frayer-Miller	Kelly Motor Truck Co. of Philadelphia	H. Webber	0	*.00765
57	Schleicher	Schleicher Motor Vehicle Co.	A. Besser	†	†
58	Standard Gas & Electric	Standard Gas & Electric Power Co.	W. Hunsberger	0	.00814
59	Gramm	A. T. Gardiner	A. Nott	0	.01226
60	Packers	Packers Motor Truck Co.	C. H. Smith	†	†
		PRIVATE OWNERS' DIVISION—Class A (1½ tons capacity and less)			
19	Autocar	Strawbridge & Clothier	G. Smith	0	.01354
20	Autocar	John Wanamaker	O. Green	0	*.00898
21	Autocar	Bailey, Banks & Biddle	J. J. Frewen	0	.01539
22	Autocar	Bailey, Banks & Biddle	J. A. Hess	0	.02183
23	Autocar	Lindsay Bros., Inc.	J. H. Lindsay	13	.01282
24	Autocar	Consolidated Rubber Tire Co.	J. Justice	0	.01697
25	Maxwell	Coca-Cola Co.	A. H. Whitcomb	0	.05188
27	Autocar	Cluett, Peabody & Co.	J. A. O'Neill	0	.01386
28	Autocar	Cluett, Peabody & Co.	J. M. Beatty	28	.01407
29	Autocar	E. Bradford Clarke	F. Donnelly	59	.01096
30	Autocar	Fritz & Larue	F. J. Scullin	5	.01135
31	Rowan	Wright, Tindale & Van Roden	A. W. Knerr	2	.03784
32	Autocar	Michael Del Collo	M. Del Collo	145	.01569
33	Autocar	Eshelman & Craig	E. Baurichter	0	.01266
34	Autocar	J. E. Caldwell & Co.	Mr. Lyman	0	.01450
35	Autocar	A. F. Bornot Bros. Co.	G. Myers	0	.01341
36	Renault	A. F. Bornot Bros. Co.	J. G. Carvill	†	†
37	Autocar	Theo. F. Siefert	B. Siefert	408	.01446
38	Autocar	J. S. Ivins' Son.	H. V. Fancey	‡	‡
39	Cartercar	Kellogg Toasted Corn Flake Co.	W. S. Kennathy	4	.01044
40	Autocar	Crane Ice Cream Co.	N. Althouse	0	.01403
41	I. H. C.	C. M. Ware	A. Brown	0	.04485
42	I. H. C.	S. F. Slaymaker	W. Shoch	0	.05743
43	Autocar	C. J. Heppe & Sons	K. W. Poole	0	.01490
44	Autocar	Chas. W. Young & Co.	W. W. Heeley	0	.01262
45	Autocar	R. G. Wood	J. Callopy	2	.01416
		Class B (3001 pounds to 5999 pounds)			
51	Motor Commercial	Suburban Auto Express Co.	M. Plush	137	*.01642
52	Frayer-Miller	Dives, Pomeroy & Stewart	E. O. Bennett	†	†
		Class C (between three and four tons)			
64	Packard	John Wanamaker	W. Danforth	0	.01238
65	Reliance Truck	J. B. Van Sciver Company	W. Beachboard	0	.01757
66	Alco	Gimbel Brothers	G. Pohlman	2	.01401
67	Alco	Gimbel Brothers	P. J. Jones	0	.01444
68	Frayer-Miller	Fleck Brothers	A. Jones	0	*.00705
		ELECTRIC VEHICLE DIVISION—Class A (1½ tons capacity and less)			
46	Commercial Truck	John Wanamaker	H. McCargo	6	.01394
47	Commercial Truck	Bergdoll Brewing Co.	F. Bauer	14	.01280
48	Commercial Truck	American Brewing Co.	R. Rother	0	.01345
49	General Vehicle	General Electric	F. Ayres	8	*.01013
		Class B (3001 pounds to 5999 pounds)			
53	General Vehicle	Bergdoll Brewing Co.	H. Wright	15	*.00706
54	Commercial Truck	John Wanamaker	M. Melia	93	.00966
55	Commercial Truck	American Brewing Co.	F. Flubacher	144	Meter failed
		Class C (between three and four tons)			
69	Commercial Truck	American Brewing Co.	K. Bey	0	*.00792
70	General Vehicle	Shane Bros. & Wilson	J. J. Craig	30	.00828
		MAMMOTH TRUCKS (Gasoline above four tons)			
71	Mack	Shane Bros. & Wilson	E. Turgeon	2	.01258
72	Gaggenau	Benz Import Co. of America	P. W. Gaylor	0	.00818
73	Mack	W. W. Wilson	A. Cattell	1	.00738

Note—* Winner. † Did not finish. ‡ Did not start.

Quality is Induced in the Process of Forging



UNDER THE HAMMER—TAKEN FROM LIFE IN THE PACKARD PLANT AT DETROIT

THAT there is an undercurrent of strength which will sooner or later dominate the engineering side of the automobile situation is apparent to those who penetrate below the commercial level and discover what engineers are thinking about and what the problems are that confront them. When an automobile is completed and the last coat of varnish is applied, it represents crystallized endeavor, but not necessarily an engineer's complete version. Unfortunately, or otherwise, it is not always possible to accept the versions of engineers. The object in building a car is to put it into commercial service, and frequently it is found that the commercial demand is in high discord with the engineer's version. Were the engineer's complete plan to be adopted under conditions as above enumerated, the commercial history of a completed automobile would never be written.

It may seem strange to a casual observer that automobiles are revised year after year. Each new model as it is presented to an indulgent public is represented as embodying all that is good, and the casual observer wonders why there should be any change. This character of observer is like one of the subscribers of THE AUTOMOBILE, who, when requested to renew his subscription, appended a foot-note to the request which read like this: "Kind Friends—Your journal has furnished me all the information I require and I will not be able to subscribe further; so please discontinue." If this subscriber wakes up in two years, and will then look at the automobiles of that time, he will have to ask somebody what they are.

The word "standard" as applied to anything means absolutely nothing, excepting that it conveys the impression that contemporaneous things may be on a certain basis. Evolution is ever going on, and standards shift, due to its onslaught. When an

engineer lays out the latest and most approved type of automobile he does the best he can with his light, considering the character of materials available, not forgetting the wants of the supporters of the industry. If the best materials available can be improved upon by fabricators thereof, it stands to reason that the designer will find himself behind progress the very instant that the new materials arrive. If the purchasing public reaches new conclusions the engineer will take the hint.

Each year brings its crop of refinements, and they permeate every phase of the entire situation. In summing up the possibilities for improvement there will scarcely be any chance of disagreement if they take on the phases as follows:

(A) Improvements in manufacturing processes have the effect of (a) reducing the cost of manufacture and (b) making it possible to finish stronger and better materials.

(B) A closer study of designs suggests the possibility of utilizing different methods, multiplying production processes, and taking advantage of automatic means.

(C) Experience on the road enlightens the users who transmit that experience through commercial departments back to the designing office, and attempts are made to incorporate the new ideas.

(D) Stress of circumstances, as a famine of certain kinds of material, introduces new complications, affecting not only the methods of design, but the processes of manufacture as well.

(E) Style has its marked effect. The artistic eye is no more fixed than the standard. As the eye is trained it sees things differently. The result is a change in the appearance of the product.

(F) Legal restrictions are loosened up in time, and designs are changed to conform with the new demands.

(G) Racing and other contests, while they are in a sense sporting events, are in all fairness severe methods of testing, and the capable engineer learns more about the factor of safety than he might otherwise know, with the chance that changes have to be made to bring about unity in the factor of safety as it resides in the several members in order that all the links in the chain will be of the same length.

(H) Locality influences the situation. If a car is produced with the intention that it will best serve in a certain locality, and it proves to be so, the idea will spread, and despite the fact that the car, as produced, is only intended for service in that locality, it will be adopted for other places for no good reason.

With pressure coming from many sources, it would seem as if the time will never arrive when cars will be on a so-called standard basis, nor should there be any complaint on this score. The Navies of the world afford the best illustration of progress along standard lines than anything else ready at hand. The Dreadnought of to-day is probably just as near finality as the 44-gun frigate of the line which was affected by the Navies of the world before even the Monitor was thought of. Each new creation promises to be the best attainable, but those who accept such versions fail to take into account the fact that the promise is invariably advanced by the creator, and that no allowance is made for those who, in the light of all experience, take up the burden with greater vim and advance the work.

Transmission of an Automobile

WHAT K. W. NAJDER, M.E., HAS TO SAY ABOUT A TRANSMISSION GEAR; DEALING WITH IT IN A TECHNICAL WAY

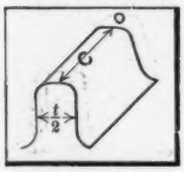


Fig. 1—Diagram of tooth as used in rendering elucidation of formulæ of same

THE speed of a motor may vary between certain limits, and thereby the speed of the car is also affected. Because the power of the motor is directly proportional to the speed, therefore, when the maximum power of the motor is required it must run at its highest velocity. We see that the ratio of the revolutions of the engine to the revolutions of the driving wheels must be capable of variation.

To design a transmission for an automobile, the following data must be known: (1) Normal speed of the motor in r.p.m. (2) Number of speeds required. (3) Value of these speeds in miles per hour. (4) Diameter of the driving wheels. (5) Horsepower of the motor.

Let: V = velocity of an automobile, 20 miles per hour.
D = diameter of the driving wheels, $2r = 36$ inches.
N = normal speed of the motor, 1,000 r.p.m.
n = number of revolutions of the wheels.
12 HP of motor. Then:

$$n = \frac{V \times 60}{2r\pi}, \quad V = 20 \text{ miles per hour,}$$

As 1 mile = 5280 feet, then $V = \frac{20 \times 5280}{60 \times 60} = 29.3$ ft. per sec.

36 inches = 3 feet, so $n = \frac{29.3 \times 60}{3 \times \pi} = \sim 186$ revolutions.

As the speed of the motor is 1,000 r.p.m., therefore, the transmission must be of ratio $T = \frac{1{,}000}{186} = \sim 5.3$ or T = 1:5.3.

Assuming that the maximum velocity should be 20 miles, and the minimum velocity 5 miles per hour, then the ratio must be:

$$T = \frac{5}{20} = 1:4, \text{ or } 250 \text{ revolutions.}$$

We must figure the strength of the tooth:

$$\text{Circular pitch } t = \sqrt[3]{\frac{Md \times 2\pi}{\Phi K \times Z}} \text{ (from Hütte).}$$

$$\text{Twisting moment } Md = \frac{63{,}025 \times HP}{r.p.m} = \frac{63{,}025 \times 12}{1{,}000} = 756 \text{ inch-pounds.}$$

$\Phi = \frac{b}{t} = 1.2$ for auto transmission gears.

$Z_1 = 16$ teeth on the first gear.

K = 1,000 pounds per square inch.

$$t = \sqrt[3]{\frac{756 \times 2\pi}{1.2 \times 1000 \times 16}} = \sqrt[3]{\sim 0.24} = 0.62'', \text{ or the thickness of}$$

the tooth is $\frac{t}{2} = 0.31'' = \sim 5/16''$, and this corresponds with 6-8 diametral pitch.

The length of tooth is $C = t \times \Phi = 0.62'' \times 1.2'' = 0.744 = \sim \frac{3}{4}''$.

$$\text{Pitch diameter} = \frac{\text{number of teeth}}{\text{diametral pitch}} = \frac{16}{6} = 2\tfrac{2}{3}''.$$

Z_1 { Pitch diameter $= 2\frac{2}{3}''$; Number of teeth $= 16$; Length of tooth $C = \frac{3}{4}''$; D. P. $= 6-8$

The transmission countershaft shall make half revolutions of the motor, or:

$$Z_1 N_1 = Z_2 \frac{N_1}{2} = Z_2 \times N_2.$$

$$N_2 = \frac{N_1}{2} = \frac{1000}{2} = 500 \text{ revolutions.}$$

$$Z_2 = \frac{Z_1 N_1}{N_2} = \frac{16 \times 1000}{500} = 32.$$

$$\text{Pitch diameter} = \frac{32}{6} = 5\tfrac{1}{3}''.$$

$$Z_2 \begin{cases} \text{Pitch diameter} & = 5\frac{1}{3}'' \\ \text{Number of teeth} & = 32 \\ \text{Length of tooth C} & = \frac{3}{4}'' \\ \text{D. P.} & = 6-8 \end{cases}$$

We took the maximum velocity 20 miles and the minimum 5 miles per hour. It is suitable to take for the second speed the mediate speed of these two maximum and minimum speeds:

$$V_2 = \frac{20+5}{2} = 12.5 \text{ miles.}$$

$$N = \frac{1000+250}{2} = 625-640 \text{ revolutions.}$$

We need for these revolutions following ratio of pair of gear:

$$\frac{Z_4}{Z_3} \times N_2 = N_3.$$

$$\frac{Z_4}{Z_3} \times 500 = 640, \quad Z_4 + Z_3 = 48 \text{ teeth.}$$

$$\frac{Z_4}{Z_3} = \frac{640}{500} = \sim \frac{27}{21}, \text{ then } Z_4 = 27; \; Z_3 = 21.$$

$$\text{Pitch diameter } D_3 = \frac{21}{6} = 3\frac{1}{2}''.$$

$$\text{Pitch diameter } D_4 = \frac{27}{6} = 4\frac{1}{2}''.$$

$$Z_3 \begin{cases} \text{Pitch diameter} & = 3\frac{1}{2}'' \\ \text{Number of teeth} & = 21 \\ \text{Length of tooth C} & = \frac{3}{4}'' \\ \text{D. P.} & = 6-8 \end{cases}$$

$$Z_4 \begin{cases} \text{Pitch diameter} & = 4\frac{1}{2}'' \\ \text{Number of teeth} & = 27 \\ \text{Length of tooth C} & = \frac{3}{4}'' \\ \text{D. P.} & = 6-8 \end{cases}$$

The minimum velocity is $N_4 = 250$ revolutions.

$$N_4 Z_5 = N_2 Z_6, \text{ or}$$

$$1000 \times Z_5 = 500 \times Z_6, \text{ then } Z_5 + Z_6 = 48 \text{ teeth.}$$

$$\frac{Z_6}{Z_5} = \frac{500}{1000} = \frac{16}{32}, \text{ then } Z_5 = 32; \; Z_6 = 16.$$

$$\text{Pitch diameter } D_5 = \frac{32}{6} = 5\frac{1}{3}''$$

$$\text{Pitch diameter } D_6 = \frac{16}{6} = 2\frac{2}{3}''$$

$$Z_5 \begin{cases} \text{Pitch diameter} & = 5\frac{1}{3}'' \\ \text{Number of teeth} & = 32 \\ \text{Length of tooth} & = \frac{3}{4}'' \\ \text{D. P.} & = 6-8 \end{cases}$$

$$Z_6 \begin{cases} \text{Pitch diameter} & = 2\frac{2}{3}'' \\ \text{Number of teeth} & = 16 \\ \text{Length of tooth} & = \frac{3}{4}'' \\ \text{D. P.} & = 6-8 \end{cases}$$

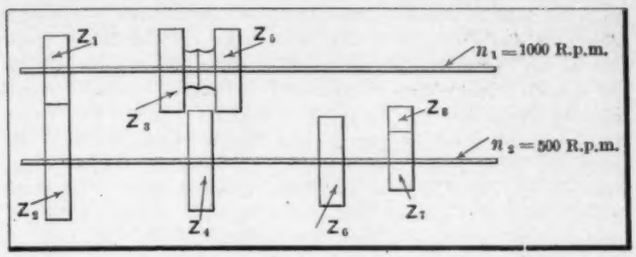


Fig. 2—Sketch showing relation of prime and lay shafts of a sliding gear transmission used in figuring speeds and other relations

We take for reverse 220 revolutions

$$Z_8 + Z_8 = 48 \text{ teeth.}$$

$$Z_8 = 48 - Z_6 = 48 - 32 = 16.$$

$$\text{Pitch diameter} = \frac{16}{6} = 2\frac{2}{3}''$$

$$Z_6 \times 220 = Z_8 \times N_8.$$

$$N_8 = \frac{32 \times 220}{16} = 440 \text{ revolutions.}$$

$$Z_7 \times 500 = Z_8 \times 440.$$

$$Z_7 = \frac{Z_8 \times 440}{500} = \frac{16 \times 440}{500} = \sim 14.$$

$$\text{Pitch diameter} = \frac{14}{6} = 2\frac{1}{3}''.$$

$$Z_7 \begin{cases} \text{Pitch diameter} & = 2\frac{1}{3}'' \\ \text{Number of teeth} & = 14 \\ \text{Length of tooth} & = \frac{3}{4}'' \\ \text{D. P.} & = 6-8 \end{cases}$$

$$Z_8 \begin{cases} \text{Pitch diameter} & = 2\frac{2}{3}'' \\ \text{Number of teeth} & = 16 \\ \text{Length of tooth} & = \frac{3}{4}'' \\ \text{D. P.} & = 6-8 \end{cases}$$

Applying the direct drive we get:

$$N_1 = 1000 \text{ revolutions} = 20 \text{ miles per hour.}$$

Applying the second speed we get:
(Z_3 with Z_4)

$$N_2 = 500 \frac{Z_4}{Z_3} = \frac{500 \times 27}{21} = 650 \text{ revolutions} = \sim 12.5 \text{ miles.}$$

Applying the third speed we get:
(Z_5 with Z_6)

$$N_3 = 500 \frac{Z_6}{Z_5} = \frac{500 \times 16}{32} = 250 \text{ revolutions} = 5 \text{ miles.}$$

Applying the reverse speed we get:
(Z_7 with Z_8)

$$N_4 = 500 \frac{Z_7}{Z_8} \times \frac{Z_8}{Z_5} = 500 \frac{14}{16} \times \frac{16}{32} = \sim 220 \text{ revol.} = 4.4 \text{ miles.}$$

Vulgarized Pyrometry

BY MARIUS C. KRARUP. HOW THE PRACTICAL MAN MAY MEASURE THE HEAT OF STEEL ACCURATELY BY IMPROVED METHODS FOR COLOR COMPARISON

NEARLY every scientific instrument destined for popular uses passes through a stage in its employment at which a certain fondness for its difficulties permits its most obvious practical utility to be obscured. Successively the micrometer, the plotted curve which shows the inwardness of things (when it is not doctored), and the diagrams of the manograph (which dexterously used will prove any theory to be right or wrong), have passed from the scientific stage into daily life and work, and now the pyrometer, the birth companion of special steels, seems to be shedding the fuzzy feathers of the laboratory and donning its overalls.

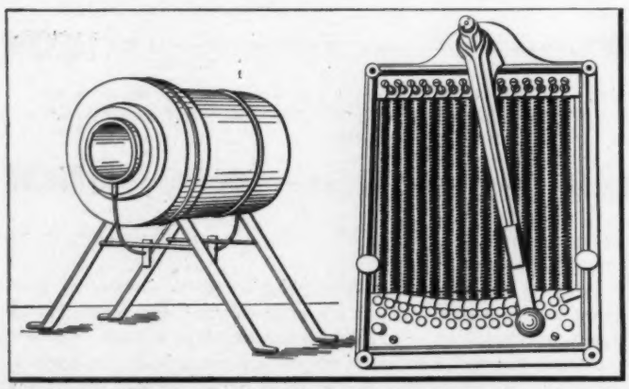
For a few years it has been pointed out to visitors at ambitious factories as the *pièce de résistance* of the technial manager's intelligent care and discrimination, and in some instances the "temper man" has been induced to believe in its readings almost with as much confidence as he would repose in his own eyesight and native judgment of heat colors. But this is far from saying that he would ordinarily consult it when work was

brisk and unobserved or would exercise spontaneous zeal to see that the heat at the hot couple and the heat in the work were alike. It was a nice, instructive pet, however, abundantly fruitful in hot, persuasive terms of more than one syllable. With its catalytic, platinogene metals and the eccentricities of recalescence humps for Ar 1, 2 and 3, it was a dear little storehouse for Latin and Greek derivatives and reflected real dignity on the shop and the calling; and it could very properly, if needs be, charged to the advertising department, which carries all those other overhead expenses for which no one wishes to be responsible.

Finally the pyrometer, by sheer intrinsic merit, is emerging from under the encumbering load of erudition and is proving its ability to pay real money for board and lodging. The recent discourse on its evolution and possibilities at the meeting of automobile engineers at Detroit and the subsequent articles in this journal on the same subject have excellently defined its status in the factory and blacksmith shop. It is useful for all and necessary for those who are determined to produce the best from any given set of steel materials, whether the materials be the most expensive or selected on a strictly economical basis. Among the simple and practical methods for using the pyrometer properly one seems to be omitted, however, which the writer would judge to be particularly well adapted for rapid work under all circumstances, for hand and drop forging, for which a pyrometer is now seldom used, and for hardening, tempering, casehardening and annealing in all shops in which the furnaces and ovens cannot be relied upon to give an absolutely uniform heat. As the suggested method has evidently not been tried very widely, there may be drawbacks to it which have escaped the writer's attention, and it is offered with those reservations which should accompany untried propositions.

Among ladies and dry goods men the human faculty for matching colors by sight is as well established as the disappointment which follows attempts at matching colors by memory or description. On the very rapid and spontaneous action of this faculty the proposed method is based. If a sample of steel may be kept heated to the degree which it is desired that the work shall reach for any given process of heat treatment or forging, the comparison of the work with the sample gives immediate ocular evidence as to whether the heat of the work is right. It must be of the same color as the sample. The eye detects at once the slightest shade of difference. It is not even necessary that the sample shall be the same grade or kind of steel as the work. The same heat produces the same color in all steels.

The makers of pyrometers themselves offer the means for always having a sample of steel at hand heated to any desired degree. The diminutive electric furnaces employed in connection with a recording pyrometer for plotting the rescalescence curve of any sample inserted in the crucible, are in some instances arranged so as to have the sample visible and in other cases may be so arranged without difficulty. They are also equipped with a rheostat and may be equipped with a better or more finely graduated one, if necessary; one which will prevent the heat of the sample from rising above any desired degree. And if the current is produced in the shop its regularity may be assured so as to further safeguard the control by rheostat.



One type of Heraeus horizontal electric laboratory furnace, with rheostat

The blacksmith usually has a dark place near at hand if he judges heat color by sight and from experience. In a corresponding place, preferably shaped as a box with one side open, the little electric furnace with the steel sample may be placed and the recording pyrometer should be conveniently near. When the work is to begin, the current is turned on and the rheostat is adjusted to arrest the heat generation at the temperature which is the desired one for the operation in hand, whether this be forging or any other. The foreman may do the adjusting, with the pyrometer-reading for his guide, and may return occasionally to observe that the reading remains unchanged. If more than one temperature is desired to be represented, as for two or more operations or two different steels requiring different temperatures, a corresponding number of electric furnaces may be placed side by side, each with its rheostat, and they may be adjusted from a single pyrometer, successively, though one pyrometer for each furnace gives a better chance for checking the work as it proceeds.

For work with particularly delicate steels, the use of two crucibles, one with a sample at highest permissible heat and another with the lowest permissible heat, would probably be highly advisable and would train the blacksmith to rapid accuracy in the matching of colors.

By comparison, the most elaborate provisions made at present for the use of pyrometers in factories offer no handy method for deciding when the work has cooled too much for proceeding without reheating, while with the method proposed the workman can readily stick the work into the dark box and make an instantaneous comparison with his heat samples.

Evidently the "constant-heat sample"—to coin a brief term for designating the proposed method—cannot replace either the salt bath, where this is employed mainly for securing the uniform penetration of heat into the work or for the rapid heating of the surface, with the core maintained at the finer texture of a more reduced temperature. Neither can it take the place of a pyrometer connected directly with the forge, the casehardening oven or the annealing oven, since it is necessary to protect against overheating in these places, but it may be a matter of development to arrange for employing the same set of pyrometers for all these purposes.

In practice there may be a few other things to look out for. While it is known that electric furnaces on a large scale may be constructed with very satisfactory guarantees for the steady maintenance of the same identical heat and are so built in conjunction with salt bath apparatus of very moderate size, the requirements in this respect are not very strict with regard to those used for ascertaining the critical points in steel, because they are simply run up to a high temperature and the observations of recalescence are made on "the cooling curve," so that no necessity exists for employing a high grade of materials. It seems possible that the steady, prolonged use of the apparatus might develop inequalities from day to day and perhaps during the progress of a day's work, but even so it would seem that, so long as the pyrometer itself remains in working order, and is consulted once in a while, no misleading can result. But in using this method for guidance in the hardening and tempering of high-speed steels, where it would be especially useful, an apparatus which is known to be reliable above 1,000° C. is of course necessary, and, on the other hand, as salt baths are rarely used here for high-speed heats, while quick work is extremely desirable, the "constant-heat sample" may in the end prove itself more necessary and economical for high-speed tool making than in any other field of work.

The accompanying illustration shows a type of the electric furnaces at present used for recalescence research in the laboratory, and statements may doubtless be obtained from the makers of

similar devices with regard to the principal points of interest. The feasibility of making a goodly portion of the area of the steel sample visible is one of these points in question, which perhaps suggests the use of hollow rather than solid cylindrical samples. The other relates to exact data on the variations of temperature to which a steel sample is subject under certain normal conditions of current and resistance, such as at two different trials each maintained for a given length of time. From casual observations it seems safe to predict that the range of variations under test will be found sufficiently contracted to afford all needed security, only one question remaining undecided after such test and this having reference to the sensitiveness of the pyrometer and its faithfulness in recording whatever changes in temperature actually take place in the sample; and this uncertainty applies with equal force to every other method for employing pyrometers.

A trial of the "constant heat sample" method is recommended to engineers and shop managers in the belief that its practical development will prove congenial under average labor conditions and a source of both saving and safety in production.

Export Possibilities

EXTRACTS FROM THE REPORTS OF UNITED STATES CONSULS IN VARIOUS PARTS OF THE WORLD SHOW MANY OPPORTUNITIES FOR OUR AUTOMOBILE MAKERS

One of the recent issues of the Daily Consular Reports by the Federal Department of Commerce and Labor contains seven articles from as many countries, all dealing with some phase of the automobile trade. The leading article is by Consul-General George N. West, of Vancouver, B. C., in which he sets forth the need of an adequate establishment in Vancouver for supplying automobile parts for replacements and repairs.

In his report the Consul General says that 250 new American automobiles have been brought into Vancouver this year and that the motor car is of particular value there because of the rapid growth of the city and the heavy demands for quick transportation.

Under the Canadian customs rules, a second-hand car, two or more years old, is required to pay duty only on the actual cost price, while newer cars must pay the same rate as those of current make. This has resulted in a considerable trade in used cars.

He points out the fact that runabouts are growing in popularity on account of the unpaved streets, which are more easily and economically negotiated in a light car than in the heavier types.

"No establishment here carries a full line of parts for repairs to auto cars," says the Consul-General, "and owners have great delay in procuring parts that may be broken."

Consul William J. Pike, of Kiel, Germany, furnishes some interesting figures on the vogue of the automobile in the German Empire. He reports that there are 49,922 automobiles registered in the Empire, and of the 12,934 foreign cars classified, the United States furnished 686. The increase in registration over the preceding period considered was 7,500 cars.

From Malaga, Spain, Consul Edward J. Norton reports that there are only 32 gasoline cars registered in that city. None of these is an American car. Consul Norton says that the field is limited in Malaga; that there are few wealthy persons residing there; that the streets are very narrow and that the regular price of gasoline is 60 cents a gallon. He says that despite these drawbacks, a few low-priced American cars might find a market.

In this connection it may be stated that Thomsen & Co., of Sydney, Australia, have applied for and have accepted the terms of the Cole Motor Car Company for the exclusive selling rights for the Cole in that territory.

Automobiles are curiosities in Venezuela and are unknown even in such a large island as Curaçao. The use of the motor so far has proved rather too much for the average Venezuelan to grasp and it is recounted in the report of Consul Isaac A. Manning, of Maracaibo, that while the need of such motors is quite apparent little effort has been expended in trying to introduce them. He says there is only one good automobile in Caracas, despite the fact that there are hundreds of miles of excellent roads adjacent to the city. In the island of Curaçao there is not a single machine. As to other uses of the motor, he says that recently the owner of several coasting sail vessels sought to augment his equipment by the purchase of a power boat of some size. He received the boat in due course, but owing to the unfamiliarity of the native and resident engineers with the use of gasoline motors, the boat is still lying up, out of commission.

Consul-General Frank D. Hill, at Barcelona, Spain, outlines a great highway project that may be undertaken in Spain in the near future. Mr. Hill states that there are only 3,000 automobiles registered in Spain and that parties of intending tourists have sometimes been warned not to undertake contemplated pleasure trips through the country on account of the uncertainty of getting through and the likelihood of encountering unbridged streams at awkward periods.

He says, however, that the Barcelona Automobile Club, through its president, the Marquis de Marianao, is urging the construction of a circuit highway from Bayonne through Central Spain to Seville, thence following the Mediterranean Coast to the French frontier, touching many of the chief cities of interest in the land. The circuit highway as proposed would be about 1,674 miles long. The initial outlay would only be about $1,500,000 and the annual upkeep in the neighborhood of $300,000. It is proposed to inaugurate the new road when it is finished with a road contest over its full length under the auspices of the Government.

Consul-General Richard Guenther, at Frankfort-on-Main, Germany, outlines the uses of the international certificate, recently adopted at the conference at Paris and endorsed by seven European countries and the United Kingdom.

He says: "An international certificate has been adopted which will only be issued if the cars and the drivers meet the requirements agreed upon. This certificate is in the form of a booklet, on the cover of which and on the first and last pages the certificate is stated in the language of the country where it was issued. On the other pages this text appears in the language of the various countries parties to the agreement, so that the frontier officials can examine the certificate without difficulty. It is also provided that the motor cars in addition to the home number must show a sign denoting their nationality. The present German mode of attaching a sign to the car by the frontier officials is therefore done away with for the traffic between the several countries to the agreement. For marking dangerous places along the roads, special numbers have been agreed upon. This international agreement became effective recently."

An American Consul reports that a European government is contemplating the purchase of quite a number of automobiles, not the armored automobile type for actual fighting purposes, but for transportation and scouting purposes. The Consul states that a high-class American machine would stand a good chance for perferment to the extent of several orders, merely for the purposes of trial, and these might lead to a very large order six months hence; consequently, American manufacturers who are interested should take note before it is too late to demonstrate their product and make preparations accordingly. The Bureau of Manufactures can furnish details.

Letters

ANSWERS TO INQUIRIES WHICH WILL THROW SOME LIGHT ON THE COMPLEX RELATIONS OF FUEL AND TIMING, GIVE ADVICE AS TO GEARING A CAR HIGHER, AND DISPENSE OTHER INFORMATION OF A GENERAL CHARACTER WHICH MOTORISTS WILL FIND OF INTEREST

Complex Relations of Fuel and Timing

Editor THE AUTOMOBILE:

[2,352]—Will you please enlighten me through "Letters Interesting, Answered and Discussed" on the following subject which has puzzled me for some time. What is the variable quantity which causes varying explosion pressures and thereby varying engine speeds and power output when the throttle is manipulated? I believe it is accepted that there is an ideal point in the cycle for the explosion to begin and that the spark should be timed with the idea of firing the charge at this point rather than with any thought of controlling the speed of the engine by this means. The variable, then, that I speak of must be some condition of the charge. Now there are only two things that I can think of which would affect the final explosive pressure, either the proportion of air to gasoline in the mixture, or the quantity of the mixture taken into the cylinder. On the latter depends the initial pressure and the compression pressure. Now as there is a certain proportion of air to liquid fuel that the carbureter is supposed to maintain, there is left but one conclusion, namely, that the amount of a mixture (which proportions are constant) taken into the cylinder, varies with the speed and the power output. If this is so, what is the condition of the charge at the beginning of the induction stroke? If it is at atmospheric pressure, what is the pressure at five times the power output or one-fifth the power output? It would seem that the proportions of the mixture being constant the power would be proportional to the volume at any given engine speed, which I suppose is true. This being the case, how is it that the compression of engines, as shown by experiments, is so nearly constant whether the engine is delivering 10 horsepower or 60? I understand that the engine was turning much faster at 60 than at 10 horsepower, possibly six times as fast, which would permit of the same amount of gas per explosion in both cases; but this only leads me to wonder why the engine accelerated to the faster speed when the throttle was opened. Please let me hear from you on this point, explaining exactly the causes which make an engine turning at, say, 300 R.P.M. under load to accelerate to 1,000 R.P.M. or more when the passage between carbureter and cylinder is more fully opened.

Memphis, Tenn. EVERETT D. WOODS.

Time. If the ignition is early some of the force of the expanding gas will be wasted in arresting the motion of the mass. If the ignition is late, the terminal pressure will be relatively high, but the efficiency of the gas performance will be below the normal level. The ignition should be so timed that the ignition line on an indicator card will be substantially straight. There should be no continuation of the ignition, such as would fatten the expansion curve, nor should the ignition swell the compression curve. This entire subject is very thoroughly elucidated in the engineering number of the THE AUTOMOBILE of July 28, under the caption "The Prediction of Efficiency in Internal Combustion Motors," in which Fig. 1 represents an indicator diagram for the Otto cycle; in other words, for an ordinary four-cycle motor, or as it is properly termed, a four-stroke cycle motor, but if we are to be precise, the so-called Otto cycle is really the Beau de Rochas cycle because the inventor of this name discovered the plan before Otto introduced it, the date of discovery being 1862. If the reader will take the pains to examine the article in engineering number above referred to, even though it is somewhat mathematical, enlightenment will follow, since the indicator card, Fig. 1, brings out very clearly the fact that ignition should become effective at the instant of compression and before the beginning of the expansion stroke. Effective ignition, then, must take place while the piston is on the dwell point at the top of the stroke of a vertical motor as used in automobile work. There is no objection to controlling the speed of a motor by varying the timing of the spark, with the proviso, however, that the motor is not permitted to overheat, which will be true if the spark is maintained too far retarded for too long a time. It cannot be claimed that the thermal efficiency will be maintained at its maximum if the spark variation is used for speed regulation, it being the case that this method of regulating is one which is based upon reducing the efficiency of the motor until it is barely capable of doing the work to be done under certain conditions of speed. The correspondent in this case raises a considerable number of questions, and it is doubtless true that thew hole matter might be discussed much more efficaciously were he to confine himself to some one angle of this large problem for the time being. However, the ignition question has at least five proper subdivisions: (a) the efficacy of the sparking mechanism, (b) the timing of the spark, (c) if the mixture is rich, (d) if the mixture is poor, (e) involving the compression.

(a) There are a hundred reasons why the ignition system might fall below the most fitting requirement, and even with a very efficient magneto, there still remains the question of the ability of the spark plug. It has been found by a series of laboratory tests that spark plugs are frequently incapable of interpreting good magnetos; in fact, it is useless to employ a magneto that is capable of delivering a 30,000-volt spark if the spark plug breaks down at 2,000 volts. This condition obtains in practice to some extent, and it is necessary to find out just what the ignition in a given case is capable of, rather than to assure that the ignition equipment is operating in a satisfactory way, then lay all the trouble onto the mixture or timing.

(b) In the timing of the spark, to blindly assume that some angle of advance as measured upon the flywheel should prove to be satisfactory is to court a fallacy. In the first place, the timing depends for its value upon the compression, then upon speed, again upon the lag angle of the coil, finally upon the burning qualities of the mixture. In solving any complex problem it is necessary to eliminate some of the unknown quantities in order to fix values for the others; this is a particular example of a complex nature, and a process of elimination must be utilized before stable values can be arrived at.

(c) In discussing the quality of the mixture, it will be a waste of time to talk about what it will do before an attempt is made to find out what it is composed of. The chief constituents of gasoline are as follows:

CHARACTERISTICS OF CONSTITUENTS OF AUTOMOBILE GASOLINE

Constituent	Specific Gravity	Chemical Composition
Pentane	0.640	$C_5 H_{12}$
Hexane	0.676	$C_6 H_{14}$
Heptane	0.718	$C_7 H_{16}$

Pentane is a mixture of hexane and heptane, the proportions varying with specific gravity. The composition of the product as it is to be had varies considerably, depending upon the source of supply, but if the specific gravity is 0.683 with a boiling point of 154 degrees Fahrenheit, the proportions by weight are a reasonable expectation, as follows:

PROPORTIONS BY WEIGHT OF GASOLINE

Pentane 2 per cent., hexane 80 per cent., heptane 18 per cent., total 100 per cent.

This composition would carry 83.8 per cent. carbon and 16.2 per cent. hydrogen, requiring about 3.5 pounds of air for a theoretically right mixture per pound of the gasoline.

(d) If the mixture is rich, the low limit will be between 3,400 and 4,000 volumes of air to 1 volume of liquid gasoline. At 3,400 volumes of air per volume of liquid gasoline, the mixture is substantially non-burning; at all events, the ignition system would have to be highly efficient to start the burning and the rate of flame travel would be very slow, indeed. For the best result there should be 1 volume of liquid gasoline to about 8,000 volumes of air, and a poor mixture would be made up of 1 volume of gasoline to about 10,000 volumes of air.

It is a reasonable assumption that some results may be realized under the worst conditions between 4,000 and 10,000 volumes of air per volume of liquid gasoline, but it is also plainly evident that the highest efficiency will only be realized when the air is in the ratio of 8,000 volumes to 1, and there are an infinite number of possibilities within the allowable limits which, if given consideration, will adequately account for many of the variations to be noted in every-day practice.

(e) Involving the compression it will be remembered that the amount of air required will have to be increased as the compression is increased for the reason that there must be a greater excess of oxygen present, otherwise the hydro-carbon fuel will not be burned to carbonic acid and water in its entirety due to the fact that the time is so shortened that in the absence of an excess of oxygen some of the hydro-carbon will fail to grab an oxygen mate. But the very fact that increasing compression increases the inflammability of the mixture adds to the efficiency of the process if enough oxygen is present, and, theoretically, the higher the compression the better will be the result, although in practice premature ignition creeps in when the compression approximates 95 pounds per square inch absolute pressure, beyond which it is not feasible to go under the conditions which govern a four-cycle motor in automobile practice.

Some of the Facts Are Slightly Deranged

Editor THE AUTOMOBILE:

[2,353]—Please answer the following questions in "Letters Interesting, Answered and Discussed."

1. Why should not friction transmission of the simple disc type be on the high gear as well as the car with any other transmission?

2. Why should manufacturers equip their cars with a dual ignition when there are some makers of magnetos who guarantee their magnetos to start any engine of any size and horsepower on a quarter turn of the crank without the use of batteries?

3. Which do you think it would pay a prospective purchaser to buy, a car equipped with solid or pneumatic tires?

4. Will an air-cooled motor stand as much hard usage and last as long as a water-cooled motor?

5. Why can some manufacturers build six-cylinder, 50-horsepower cars and sell them for $2,000 when other manufacturers ask from $1,000 to $2,000 more for the same style car, made of the same grade of material, or is it true that the material is the same?

Palm, Ala. R. F. HENRY, JR.

1. Some cars are built that way.
2. Habit.
3. Pneumatic tires.
4. Yes.
5. Do they?

Rather Pointed Questions About Important Matters

Editor THE AUTOMOBILE:

[2,354]—Will you please answer the following inquiries:

1. In turning a curve, which of the two hind wheels pulls the most, and why is the propelling power lessened?

2. Will more or less gasoline be consumed by running under the same conditions for a certain distance at the rates of, say, 15 and 40 miles per hour?

3. When will the Selden patents now in force expire?

4. Is there any relation between the horsepower used by a horse in pulling a machine and the same power applied by the engine in self-propelling?

5. Is the impact on a pneumatic tire under a certain pressure, against an obstacle, required to be greater than the pressure in pounds per square inch before the pressure in the tube will be raised? In other words, will a loaded car show greater pressure on the tires than when the wheels are jacked up?

Rome, Ga. R. M. H.

1. The outer wheel. The reason for this lies in the fact that it presses on the roadbed with greater force. The reason it presses on the roadbed with greater force is because it serves as the fulcrum when the car tends to turn over, and the inner wheel tends to leave the ground. The propelling power may not be less. If the speed of the car is not reduced it is self-evident that it takes more power to maintain that speed on a curve than it would on a tangent (straight line).

2. Power is required by a car on an increasing basis as the speed is increased. Just what the increase in power will be depends upon the condition of the roadbed, shape of the car, wind resistance, etc. In view of the variable nature of the problem, it is not possible to definitely state just what the increasing power will be unless definite measures are taken in the process of finding out. It is certain, in any event, that the power required to go a certain distance at 15 miles per hour will be less than the power required to go the same distance at 40 miles per hour.

3. The Selden patent is No. 549,160 and was taken out November 5, 1895. The life of a patent is 16 years. There is a chance that this patent may be given a new lease of life; if so, it will run for 16 years more.

4. One horsepower is equal to the force of 33,000 pounds lifted 1 foot in 1 minute, or the equivalent. It makes no difference how the effort is made, whether it be by a horse or an automobile; it is immaterial as to whether the weight is lifted 1 foot in 1 minute or if the reverse holds and the weight falls 1 foot in 1 minute. It will be the same horsepower if 33,000 foot-pounds are expended in 1 minute in drawing a vehicle. It will be the same effort if the vehicle is propelled.

5. Any force that will compress the gas in the tube will raise the pressure in pounds per square inch. When the wheel is jacked up the volume of air in the tire is afforded a certain space, hence a certain pressure will be manifest; but when the wheel is supporting the load, the volume of the air will be reduced, hence the pressure per square inch will increase accordingly.

Looking for Trouble in the Most Direct Way

Editor THE AUTOMOBILE:

[2,355]—I have a 40-horsepower shaft-drive motor geared about 3 1-2 to 1. My desire is to gear the car higher, as I want more speed. Could you suggest a proper gearing, and the best way to change the original? The transmission is of the progressive type and no "direct on the high" or third speed.

New York City. ARTHUR J. SHAFER.

The sum of the teeth in each set of gears in the transmission system must be the same. This means that the sum of the teeth of any one set cannot be changed; it will be possible, however, to subtract from one gear as many teeth as are added to another, but it is highly improbable that there is sufficient room in the gearset to allow of increasing the number of teeth in any one of the gears. The bevel-gear set offers small opportunity for the purpose here mentioned for the reason that there may be no room available which will permit of using a large diameter gear, although the bevel pinion could be reduced in size if it has more than 14 teeth as now constituted. In all probability the motor would be overloaded were the ratio changed to give a higher speed to the car. It is also to be remembered that the life of the car will be enormously decreased if its speed is increased. It is well to remember that tire depreciation becomes a serious matter with increasing speed.

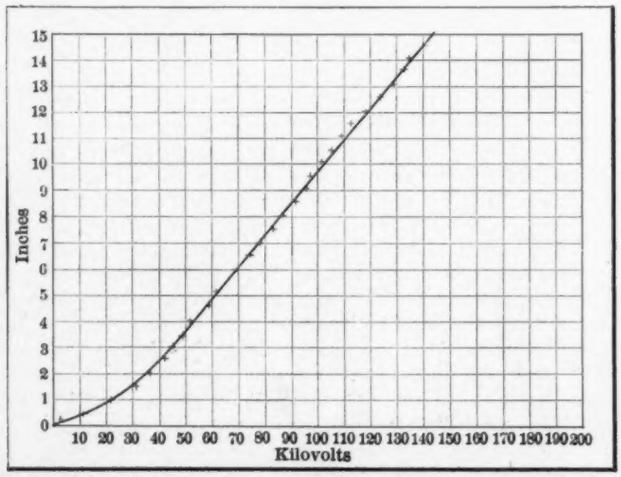
Questions That Arise

FORMULAE FOR SPRINGS; STUB TOOTH GEARS; AUTOMATIC VALVES; SHOCK ABSORBERS; HIGH VOLTAGE MEASUREMENTS; THE FLAMING ARC

[205]—There seems to be a good deal of uncertainty in the minds of users of automobiles as to the legitimate scope and practicability of shock absorbers. Just what is the reasonable expectation with their use, and why do some of them seem to fall short of the requirement?

There is absolutely nothing new about the shock-absorber idea; it had its inception when railroad trains were brought into vogue, and the so-called bumper on a freight car would be incomplete without a shock absorber. In freight-car work, where the shock absorber has to contend with strenuous conditions, there are two principles in common use, one of which depends upon the action of a spring, and the other upon friction. Discussing these two principles, it will be readily appreciated that the spring idea takes into account the desirability of gradually absorbing the energy stored in the moving mass. Spring bumpers produce train oscillations, due to the fact that the springs give back, in a reactive sense, the energy stored in them, and enough work is done in the form of oscillations to absorb the energy of impact of the cars as they bump into each other. That the energy must be absorbed before the cars will be brought to rest is self-evident, but a more quiet way of obtaining the desired result is represented in the form of bumper that dissipates the energy through the medium of friction, which is the second principle involved. The friction bumper has no reaction component; all the work is dissipated in the form of heat. As regards the instability of some forms of shock absorbers employed in automobile work, it can only be explained on the ground that the method of utilizing the principle is too frail. If bumpers can be made which will do the work in freight-car practice, involving long trains, surely they can be so contrived that they will serve perfectly in stopping the vertical bounce of the chassis frame and its load as represented in an automobile. The illustration here afforded shows the performance of a friction type of shock absorber under road conditions. The vertical bounce of the chassis frame is represented by the series of irregular lines above and below zero. The zero position is representative of the position of the chassis frame when the car is standing still. The test was made on a 50-horsepower Léon Bollée touring car with an Ellsworth Bumpometer.

[206]—How are high voltages measured in spark coil work? Are there any instruments, as voltmeters, of the conventional sort that will do this work?



Ratio of length of spark gap to voltage in the arc as arrived at in regular alternating current work

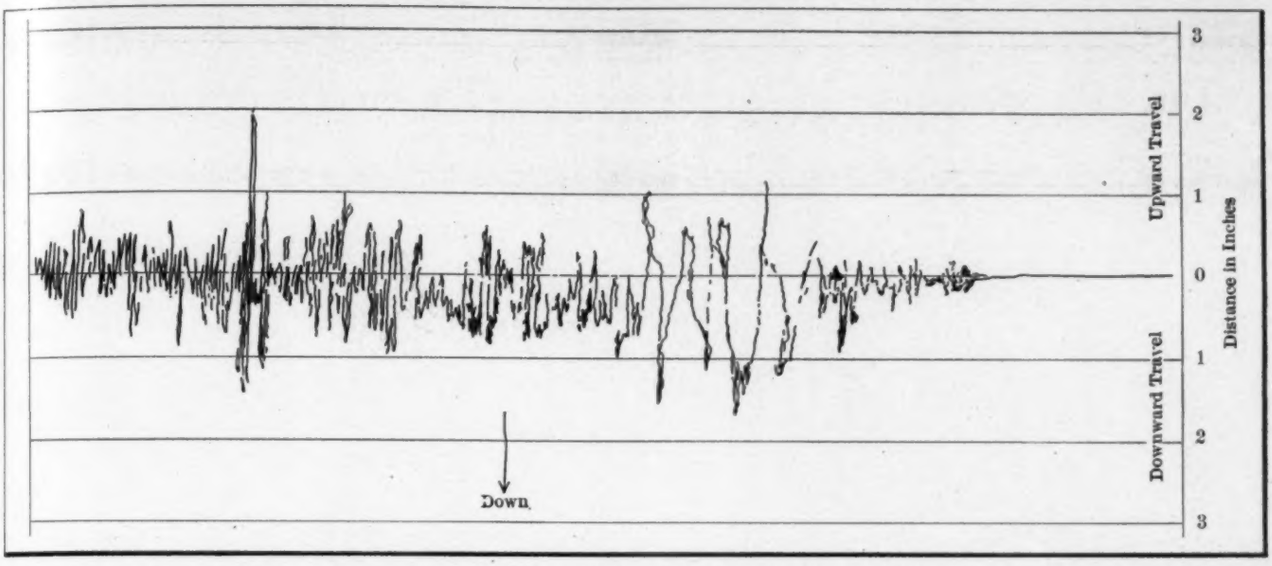
When it is desired to measure thousands of volts, conventional forms of instruments fall short of the requirement, and the length of the spark gap is measured instead, from which length, through the use of a calibrating curve, the voltage is estimated. The estimate is of course somewhat inaccurate, but the chances are that the error is within 2 or 3 per cent. The curve here given will suffice to illustrate the idea. In this curve the abscissæ read kilovolts (kilo means 1,000, hence thousands of volts) and the ordinates read inches, length of the spark gap as measured in the open air. It will be remembered that the resistance of the gap will increase with the pressure of the gas, and in ignition service on this account allowance must be made for the increased resistance due to the gas in the cylinder. The curve here shown indicates that it takes 20,000 volts to jump a gap substantially 1 inch long. In other experiments it has been found that a spark that will jump a 1-2 inch gap in the open air will barely suffice for a 1-32 inch gap in a spark plug under pressure in the cylinder. It would seem that a 1-2 inch gap in the open air will be broken down under an electromotive force somewhat below 9,000 volts.

Photograph of spark from a Bosch magneto used to illustrate the text descriptive of what is designated as the "flaming arc"

[207]—What is the meaning of the designation "flaming arc" as applied to a magneto?

When an ordinary spark coil is used, the energy dissipated in the spark-plug gap is limited to that which is represented by the voltage at the instant of breakdown multiplied by the current in amperes. The spark coil is a transformer of electrical energy rather than a generator thereof. In view of this fact no energy can be expected from the spark coil, excepting that which is represented at the instant of breakdown. The so-called "flaming arc" is present when the energy is delivered by a high-tension winding in connection with the armature winding on the armature of a magneto. The high-tension winding does all that a spark coil can do in that the electromotive force impressed thereon is sufficient to disrupt the gap in the spark plug, but since the magneto is a generator as well as serving in the capacity of a transformer there is a follow-up current supporting the initial discharge, which produced the so-called "flaming arc." The situation is adequately depicted in the illustration here afforded, which was made by photographic methods, utilizing a Bosch high-tension magneto in the process.

[208]—Is it not true that a great many spring breakages occur in even the better class of automobiles, and does this not indicate that there is a lack of appreciation of



Record taken from an Ellsworth bumpometer showing the vertical bounce of a 50-horsepower Bollée car on ordinary New Jersey roads representing an average condition

the desired qualities in springs for this service? Does the fault lie in poor material, or are the methods of design so complex that spring makers are incapable of putting them into practice?

There is a fundamental reason why the best obtainable material for spring suspensions is worked to the limit of its ability, and is likely to fail in service in the course of time, although the evil day should be deferred. Take the half-elliptic type of spring suspension, for illustration; the best result comes if the span of the spring in each case is long, but the extreme fiber strain must be a near approach to the elastic limit of the material. No spring of this type will give the desired easy riding qualities unless the material is worked at a high stress. If there is too much material in the spring and the extreme fiber strain is low, the action will be soft, and the spring will fail to respond to the induced oscillations due to road inequalities. There are two points of view for the designer, one of which is independent of the formulæ as here given, i. e., the life of the spring will be long or short depending upon the quality of material used in the spring, independent of the quantity required as indicated by the formulæ. In other words, the foot-pounds of work that should be put upon the material on a basis of safety must be limited. It is very likely that a safe basis is inside of five foot-pounds per pound of material used. The formula as follows is in the simplified form, and will suffice for a spring maker of competence. It will be of small value, however, to a novice.

In the designing of semi-elliptic springs, while it is true that there must be a certain mass of material to properly do the work no matter what the conclusion may be from the formula point of view, the fact remains that an approximation of the true size will help in the process, such as the following: Let,

S = span or distance in inches between the eyes at the extremities of the spring;

B = breadth of the spring-plates in inches;

t = thickness of the plates in 1-16 inch units;

N = number of the plates in the make-up of the spring;

W = load in tons of 2,000 pounds on the spring;

k = a constant depending upon the character of material used. When,

$$N = \frac{WSk}{Bt^2}$$

The value of k is 11 for ordinary work; it should be lowered somewhat if the springs are to be more perfect; it may be increased a little if the character of the material used in the spring-plates is on a high plane; care should be exercised in any process which adds to the burden of the material.

It is frequently desired to check back with a view to determining the deflection in inches, per ton of load, considering a given spring. A formula that is regarded as comprehensive for this purpose is written as follows: Let,

D = Deflection in inches per ton of load, S, B, t, N, represent values as before

When,

$$D = \frac{S^3}{k B t^3 N}$$

The employment of a capable formula is really a small detail in the manufacture of springs. The question of material is of the utmost importance. The better the material the more quickly it will be spoiled in a poorly equipped plant, or if it is manipulated unscientifically. The best results come if the methods for heat treatment are adequate for the needs, assuming that a pyrometer takes the place of "rule-of-thumb" methods which formerly obtained in the manufacture of carriage springs. But a pyrometer may be the source of much trouble if it is not handled in accord with its characteristics. The readings taken from a pyrometer will be absolutely wrong if the cold end is not maintained at a constant temperature; preferably the temperature should be 0 degree centigrade, unless the pyrometer is calibrated at some other fixed temperature that can be maintained more readily.

[209].—Why were motors formerly built with automatic valves instead of valves with a positive action?

In the early days of motor building, due to mechanical imperfections, the speed was relatively low, and automatic inlet valves work best at low speeds. When it was found desirable to operate motors at higher speeds, trouble was experienced with automatic valves, and with the perfection of positive valve motions, more power was realized, and the uncertainties which always attended automatic valves, together with the fact that they stood in the way of more power, led to their final abandonment.

[210].—What is the advantage of a stub tooth gear?

The tooth of a gear is related to a cantilever beam so that the longer it is the greater will be the fiber strain at the fixed end of the beam. Since the ability of a gear depends upon the strength of the material up to its limit, and limiting fiber strain for the rest, it is safe to conclude that a short tooth will offer the greatest resistance and is desirable from that point of view. As a general rule, the Brown & Sharpe shape of involute tooth offers so many attractions that it is accepted as satisfactory, and there is a certain advantage present in maintaining a standard unless some serious objection is brought against the same.

The Pyrometer

ITS DEVELOPMENT AND USE. BEING THE THIRD INSTALLMENT OF AN ARTICLE BY WM. H. BRISTOL READ BEFORE THE SOCIETY OF AUTOMOBILE ENGINEERS AT ITS SUMMER MEETING

IN Fig. 10 a complete portable outfit is illustrated with the fire end, leads and portable instrument.

In Fig. 11 an indicating instrument is illustrated with an extra compartment containing a rotary switch. Several sets of leads and fire ends may be connected to the different points of the switch so that by turning the handle the operator can throw into circuit the fire end of any of the different furnaces, and instantly the instrument will respond, giving an indication of the temperature in the furnace to which it is connected.

The diagram Fig. 12 shows a recording instrument arranged in combination with three independent indicating instruments, each connected to its own independent fire end for three different furnaces. The indicating instruments can be located at convenient points for the observation of the operator, while the recorder may be located in the superintendent's office at a distance, and by means of switches he can connect the recorder to any one of the different furnaces, the operator having no knowledge of which furnace is switched on to the recorder. The moral influence upon the operator of the furnaces with a single recorder is in some cases almost as valuable as if there were three recorders.

The electromotive force developed by the base metal thermocouple, even though it is a great deal more powerful than that produced by the platinum-rhodium couple, is insufficient to operate the recording arm resting continuously on a moving chart. Several different designs for overcoming the friction between the moving arm of the galvanometer and the chart upon which the record is traced have been devised. The methods most commonly used in these recorders consist in either pressing the arm periodically against the chart, or vibrating the chart against the arm. The method of vibrating the chart so as to bring it into contact with the arm periodically and leaving it free to move under the influence of the comparatively feeble current between the intervals of vibration has proved very satisfactory.

By semi-transparently smoking the charts it is only necessary to vibrate the chart periodically into contact with the tip of the indicating arm, thus removing a small particle of the lampblack

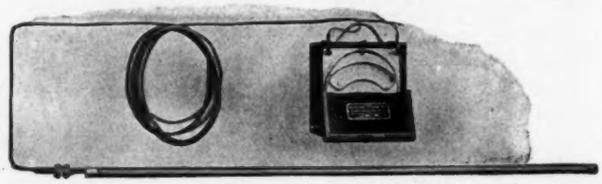


Fig. 10—Complete portable pyrometer outfit

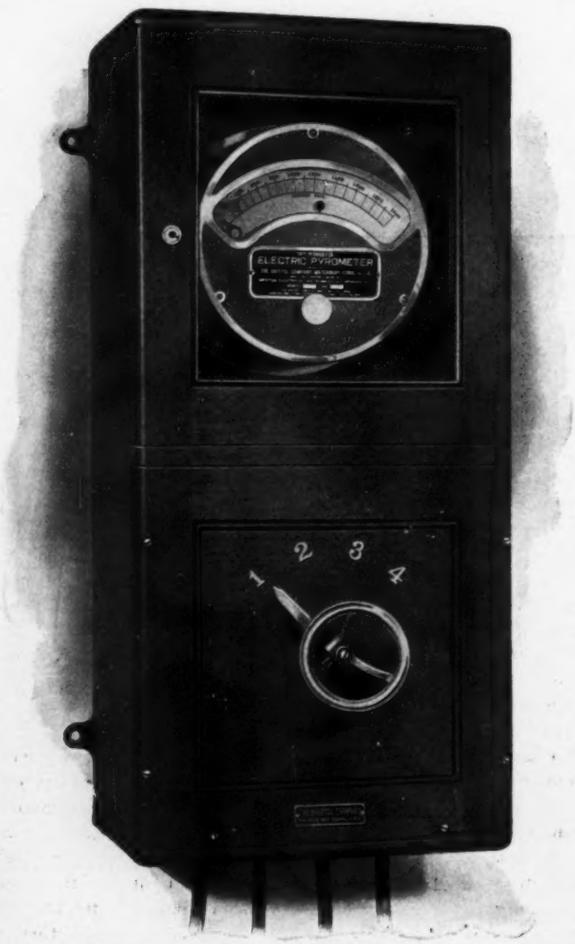


Fig. 11—Indicating instrument for electric pyrometer, with extra compartment containing rotary switch

from the chart. The series of marks made by the periodic contact of the recording arm where the carbon is removed from the chart forms a continuous curve.

A reduced photographic reproduction of a smoked chart record is shown in Fig. 13, the curves of this chart being made in determining the absorption and recalescent points of different metals.

The smoked surface of the charts is extremely sensitive to the recording arm, and after the record is completed the chart may be removed from the instrument and "fixed" by immersion in a fixative solution. After fixing, the records are permanent and can be filed for further use.

In illustration Fig. 14 an ink type of recording pyrometer is shown. In this instrument an inking pad is located in front of the chart over the arc traversed by the end of the recorder arm. A tiny capillary gold tube open at both ends is carried at the end of the recorder arm. When the chart is periodically vibrated it is pressed against one end of the tube and at the same time the other end of the tube is pressed against the inking pad. A dot of ink is left on the chart and a further supply is simultaneously taken up by the tube from the pad. Between the vibrations of the chart the pen arm is free to move without friction. The periodic vibration results in a continuous record, as the series of dots will form a curve corresponding to the changes of temperatures.

For very open scales the indicating or recording instruments are made with an initial tension upon the indicating or recording arm so that they do not begin to indicate until the working range of the scale is reached. For illustration, a scale can be readily made beginning with 800 deg. Fahr. and ending with 1800 deg. Fahr., and if a large size instrument is used the gradua-

Fig. 14—Ink type of recording pyrometer

tions may be made for 5 deg. each, making it possible to easily estimate to a fraction of these 5 deg. divisions.

Automatic Compensators

For many operations it is important that the temperatures be maintained very constant or that they be known very accurately, and it becomes necessary to take further precautions regarding the temperatures at the cold ends of the thermo-couples than shown above by the descriptions and illustrations of the extended couples. For such refined measurements, which are becoming more and more necessary, allowance must be made for changes of temperatures at the cold ends of the couple or means must be provided to maintain them at a constant temperature. A constant temperature at the cold ends is sometimes artificially produced by immersion in ice water or by having a waterjacket around the ends, through which water is made to flow. Except for laboratory and test purposes these artificial methods of taking care of the cold ends by maintaining them at constant temperature are as troublesome as they are expensive.

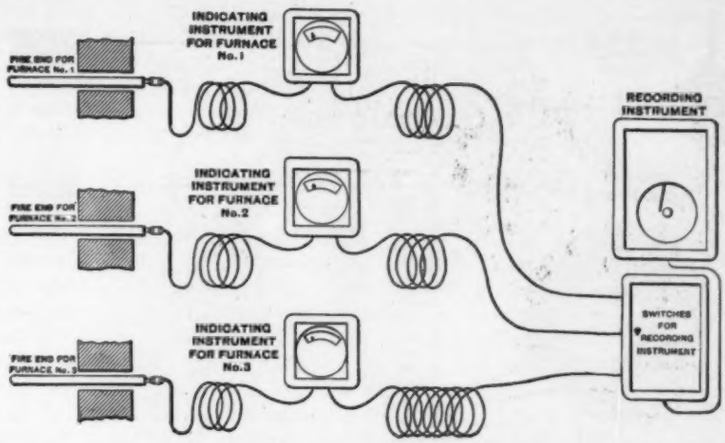


Fig. 12—Diagram of recording instrument in combination with three independent indicating instruments

In a low resistance thermo-electric system comparatively small changes in the actual resistance of the circuit, including the couple, leads and instrument, will produce sufficient effect to correct for the average changes at the cold ends of the thermo-couple. A compensating device to automatically correct for changes of the temperatures at the cold end of a thermo-electric couple has been devised, which makes it possible to eliminate the need of any corrections for changes of temperature at the cold ends of the thermo-couples and to dispense with artificial means of maintaining the cold ends at constant temperatures.

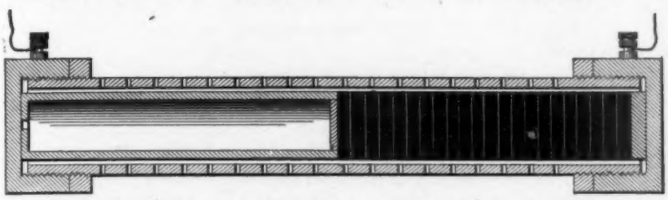


Fig. 16—Cross section of a new model of unbreakable compensator

An especially useful device, which is illustrated in Fig. 15, consists of a glass bulb with a short stem similar to an ordinary mercurial thermometer. Two platinum wires are fused into same near its tip. These are connected within the flattened bore by a loop of platinum wire, thus completing the circuit as indicated in the diagram. The size of the bulb, the cross-section of the bore, and the cross-section of the platinum wire are proportioned to suit the particular instrument and its range.

This compensator will perfectly compensate for any particular point on the scale for which it may be constructed, as for instance at the working point where it is desired that the temperature shall be absolutely independent of the changes in temperature at the cold ends of the thermo-couple when the compensator is connected in series at the cold end of couple. It is evident that if the temperature rises at the cold end of the couple the mercury rising in the stem will short-circuit a portion of the platinum loop, thus reducing the resistance of the entire circuit by the necessary amount, so that the diminished electromotive force of the thermo-electric couple, due to the rise of temperature at the cold end, will cause the same amount of current to flow through the instrument, and give the same reading, as if there had been no change of the temperature at the cold end of the couple.

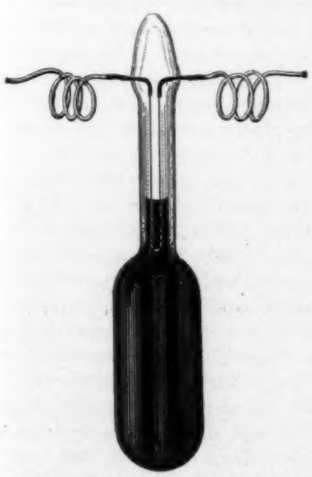


Fig. 15—Compensating device used in automatically correcting temperature changes

The compensator acts on the same principle but in a reverse manner when the temperature falls at the cold end, the resistance of the mercury being increased as the column of mercury falls. The increase of resistance in the circuit prevents an increase in the electromotive force of the couple due to the fall of the temperature at the cold end from increasing the current through the instrument, and, therefore, the reading remains unchanged. It will be seen that the same type of compensator may also be employed within the indicating instrument to compensate for changes of temperature at the instrument which would have a tendency to affect its reading.

The automatic compensator described above has been used quite extensively and successfully. In adapting these compensators for commercial service extra care has to be taken in their manipulation. Being made of glass they are fragile and when turned upside down, as sometimes occurs during transportation, the column of mercury is liable to separate in the stem.

To meet the demand for an automatic compensator which would overcome the difficulties mentioned, one has been devised which is illustrated in Fig. 16. The operation of this new model depends upon the differential expansion of a piece of metal and the tube encasing it. The tube is made of an insulating clay material, which has a very low coefficient of expansion. A tube

Fig. 13—Reproduction of a smoked-chart record made in determining absorption and recalescent points of metals

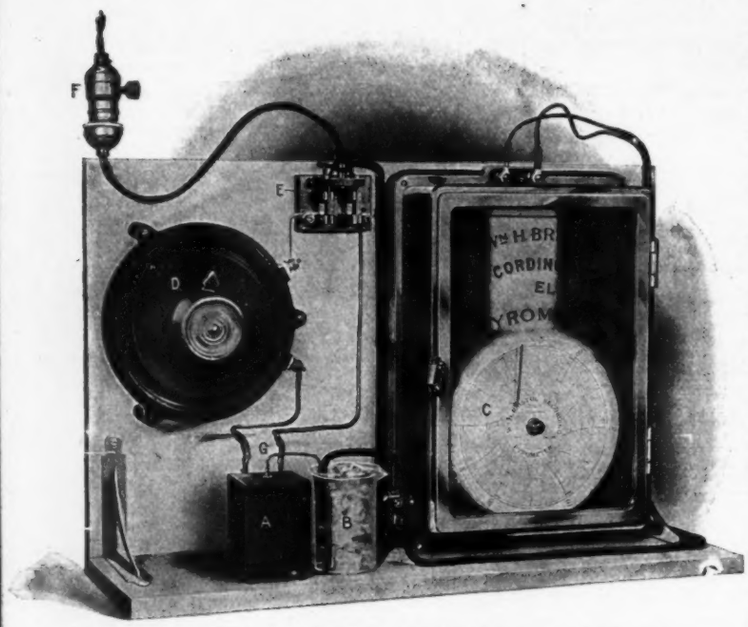


Fig. 17—Recording pyrometer, electric furnace, rheostat and connecting plug

of zinc is placed inside of the clay tube, which about half fills its length, the balance of the space being filled with discs of pure graphite. The ends of the tube are covered with metallic caps provided with screw threads and lock nuts. Electric connections are made to the caps at the ends of the tube, and the compensator is placed in series with the leads to the instrument close by the cold end of the thermo-electric couple. In Fig. 16 a cross-section of the compensator is shown, and if connected in series at the cold end of the couple its operation is as follows: When the temperature at the cold end rises the zinc tube expands more than the clay tube, and a pressure is brought to bear upon the graphite discs which reduces the resistance through the circuit from the cap at one end to that at the other where the connections are made. If the temperature at the cold end of the thermo-couple falls the zinc tube will contract, reducing the pressure and correspondingly increasing the resistance through the graphite discs.

By initially adjusting the resistance, by means of the screw caps and lock nuts, it is a simple matter to make the initial resistance such that if the temperature rises or lowers at the cold end of the thermo-couple the resistance of the compensator will be diminished or increased by the proper amount, so that the reading on the instrument will not be affected by the change of temperature at the cold end.

This compensator has not been tested out in practice, but as it will stand rough handling without any change in the resistance it is hoped that it will prove valuable in meeting the great demand for a practical automatic compensator for commercial use in connection with the thermo-electric couples.

In hardening, tempering and annealing, and other heat treatment of steels for the various parts of automobiles, since various grades of steels are used in these parts, it is an important matter to have pyrometers which can be depended upon to accurately indicate and record the temperatures during the processes and treatment of such steels.

It is a comparatively easy matter to injure steel by overheating, but by the proper use of an accurate pyrometer such mistakes are absolutely unnecessary.

As is well known, it is impossible to harden steel unless it is heated beyond the absorption point; therefore, one of the important applications of a pyrometer in this connection is to determine the absorption point. This can be done by using the apparatus shown in Fig. 17, consisting of a recording pyrometer, a small quartz-lined electric furnace, with a rheostat for regulating temperature and plug connection for attaching to lamp socket. (*To be continued*)

Digest

BRIEF RÉSUMÉ FROM 50 FOREIGN PAPERS: WORK OF A TESTING STATION—METHOD FOR REDUCING THE HEATING OF LUBRICANTS—DIFFERENCE BETWEEN TIRES—THE E. N. V. MOTOR—PHOTOGRAPHS OF EDDIES—BRAKING BY MOTOR—HINTS FOR EXPORT

Among the tests which have been demanded of the Section for Metals in the *Laboratoire d'Essais du Conservatoire des Arts et Métiers* (Testing Department of the National Conservatory of Arts and Trades), Prof. L. Guillet of this institution mentions the following in the report for 1909 just published: Mechanical and micrographic tests on a rail broken by the passage of a train, on tubes and sheets from boilers which had bursted, on chains and cables broken in service. A series of tests was made with lubricating oils and with various anti-friction metals to determine the coefficient of friction and the consumption of oil in terms of speeds and pressures. Micrography has been used right along, and has revealed particularly cases of *écrouissage* in metallic pieces only a short time in service (*écrouissage* is a deterioration of the fibre of metals, akin to fatigue but ascribed especially to the processes of cold drawing and rolling). Construction pieces and materials used in aviation, especially cables, shafts, propellers, cords and cloths, have occasioned more and more numerous tests. In the section for machines tests have been made of steam engines, internal combustion engines, gas producers, hydraulic machines, autmobiles, ventilators, etc., also tests of aerial propellers of various designs and of aviation motors. In the chemical section many of the examinations and reports have been supplementary to those in the mechanical sections, such as with reference to lubricants, rubber, fuels, metals and other construction materials. —*Le Génie Civil*, July 16.

For testing oils and bearing metals the Conservatory of Arts and Trades has two Martens machines which measure the coefficient of friction at pressures up to 100 kilos per square centimetre at speeds up to 6 meters per second, and up to a temperature of 80° C. In order to study oil heated up to 200° the laboratory makes use of a Kappf machine, consisting of a tub, or churn, in which a stem is turned by an electric motor, the stem being charged with variable weights and rotated at variable speeds. By means of the Martens machine it has been possible to show how an oil acts with regard to heating and consumption when the load and speed are varied. To this end the machine is operated at constant speed and pressure and the increase of temperature as well as the oil consumption are measured. This is repeated with the required changes of speed and pressure, one or both of these factors being kept constant throughout each test. One arrives by this method at a remarkable differentiation between oils and is able to establish the two characteristics which are of especial interest to the consumer. For the same oil it has been determined that: (1), at constant speed the coefficient of friction diminishes rapidly when the pressure increases, passes through a minimum and then rises at pressures varying generally from 60 to 80 kilos per square centimeter; (2), at constant pressure the coefficient of friction increases with the speed at low pressures, thereafter passes through a stage where it is reduced with the speed and finally increases with the speed at high pressures. The question

is throughout of the friction coefficients at equal temperatures. At constant speed the time required for reaching a given temperature diminishes with the increasing pressure according to a law which appears complicated, but which the operators of the Conservatory expect to be able to formulate before long. "The Martens machine," says the report, "has permitted us to place in evidence by special tests a certain favorable influence on the friction obtained with an oil, which may be secured by introducing in this oil a somewhat volatile lubricating product which will vaporize slightly when the oil begins to get warm and by grace of the latent heat absorbed in vaporization will retard this heating of the oil. By this method it has been possible to lubricate with superheat oil, thick and viscous as a syrup, and which was injected in the machine by means of compressed air at a pressure of 8 kilos per square centimeter.

"The metals which are studied by the aid of this machine are formed as small bushings, and it is possible to determine on these bushings, besides the factors mentioned, also the amount of metal removed by friction. In this respect the metals vary considerably from each other. Some of them show a loss which is negligible, while others, especially the phosphor bronzes, lose too much of their substance by detrition, though their friction coefficient is low."—*La Technique Automobile et Aérienne.*

With reference to the wearing qualities of rubber tires P. Breuil states in the annual report of the Conservatory for Arts and Trades that the tests conducted at this institution show that some of the rubber mixtures used in tires wear ten times as long as others under the same operative conditions, so that there is plenty of room left for continued experimentation and testing, even though rubber may properly be classified as "an organic material which has strayed into mechanics."

A cursory description is offered of the E. N. V. motor, which shares with the *Gnôme* the preference of the most successful French aviators. The 8 cylinders form a right-angled V with four in each branch. The shaft has four crank pins disposed in pairs 180° apart, six ball bearings and a ball end-thrust bearing to receive the pull or thrust of the propeller. The cams are integral with the hollow camshaft which serves all eight cylinders, the admission and exhaust valves being placed side by side in individual valve chambers for each cylinder, these valve chambers extending L-wise and inward from the top of the V. The axes of the admission valves are inclined with relation to the axes of the cylinders, by which provision dead space is reduced. The crank pins and crankarms are bored to carry lubricant by force feed to all shaft and connection rod bearings, and from the pins the oil is sent through the hollow connecting rod to the hollow piston pin, and thence to the piston, but a special provision prevents exit of the oil to the bearing surface of the piston until the latter is at the end of the power stroke. (So says the description, but gives no details explaining how an emission of the oil at the end of the suction stroke is prevented. The provision carries into effect the old demand that the main oiling of the cylinder should take place at a definite point in the cycle of movements, so that the relation of the lubricant to the heat generation may be constant and subject to rational regulation. Possibly the cylinder lubrication is limited to the period at the end of the power stroke by synchronizing the strokes of the oil pump with the cycle of the motor).

The walls constituting the water jackets for each cylinder are formed of copper precipitated by electroplating process, and internal partitions are provided in the jackets to regulate and retard the cooling. The water circulation is forced by a small turbine wheel, and the radiator is placed underneath the crank-chamber in the direct current of air produced by the forward movement of the aeroplane. The ignition is by magneto and storage battery, each system having its own plugs. The distributor for the battery ignition is operated from the end of the camshaft.—*Le Génie Civil,* July 16.

Photographs of the eddies produced by an atmospheric propeller have been taken by novel means by A. Tanakadate. He sends a stream of hot air into the cold air and thereby produces certain variations in the refraction of the light and these become visible to the camera by a quick and strong flash-light. While the hot air has a movement of its own, determined by its variation in temperature from the rest of the air which is agitated by the screw propeller, this is negligible in comparison with the much more violent movements caused by the latter.—*Comptes Rendus de L'Académie des Sciences,* July 18.

For mountaineering by automobile it is recommended to arrange a special air intake on the induction tube between the carbureter and the cylinders, and to provide means for opening this intake when desired, so that the driver, when descending long inclines, may admit fresh air to the cylinders under full compression and get the brake effect thereof, rather than cutting off both gas and air, as is more commonly done. In the latter case a vacuum is produced above the piston, and lubricating oil in considerable quantity is forced past the piston rings into the combustion chamber, where it will foul the spark plugs.—*La Pratique Automobile,* July 25.

Hints for export, in some instances relating to construction, have been compiled by a German engineer from various reliable sources. None of the data are older than the end of 1908. They are, in abbreviated substance, as follows: Imports to Russia in 1908 amounted to 3.1 million rubles, of which sum 2.8 million was for trucks or touring cars with at least four seats, and only 0.3 million for runabouts. Most of the motor trucks and omnibuses came from Germany, and most of the pleasure cars from France. In Holland the best market has been for very light vehicles at 2,000 to 3,000 francs ($400 to $600). In Egypt the demand has so far been for closed carriages of small power. Larger automobiles have been bought somewhat extensively by the ministry of finance for use by the road and street departments and by the gendarmery. The imports to the Cape Colony have reached 60,000 pound sterling annually since duties were lowered in 1906. The cars must be high and stout for rough use over the veldt. They are indispensable for communication between the cities and the mining districts, and are used in preference to the railway for one hundred mile trips by engineers and inspectors. British India, in 1908, took automobiles to the value of 6,344,300 rupees, of which the shipping trade of England received 5,294,400; Belgium, 609,700. The market is now depressed by over-imports. American cars at 3,500 to 4,000 rupees have lost ground in Bombay, where the demand is mostly for large, expensive cars, up to $16,000 apiece, for the rich rajahs, merchants and government officials, who use them for lengthy trips to the inland. The gasoline and oil tanks must be large, spare parts amply provided, and there must be provisions for strapping considerable baggage to the vehicle. For city use, to take the business men from the remote residence sections to their offices, a consular report says that cars of 16 to 30 horsepower are preferred, and that the carriage work should be conspicuous in design and color to meet the native taste, red leather being much liked, and the vehicle should be low, easy of entrance and noiseless. Single-cylinder De Dion cars of up to 8 horsepower, and with four seats, phaeton style, are sold in considerable number at 4,500 rupees. The French firm, Chenard-Walcker, has sold many chassis to which are fitted Indian-made bodies constructed from woods suitable for the climate. In Siam the demand is mostly for small automobiles of 12 to 16 horsepower and with closed or semi-closed bodies. Argentina has few roads. American high-wheelers from Chicago have been sold there to some extent. In the cities nearly all cars are French or Italian. The market in Brazil is limited to the city of Rio Janeiro, where 350 automobiles are in use, many of them bought in Paris by their owners on the occasion of European trips, and in the central State of Sao Paulo, where the country is flat and rich. The Australian yearly import trade in automobiles is represented, according to recent reports, in the sum of 262,000 pound sterling, of which the United States received 14,300 and England nominally 166,000.—*Zeitschrift des Mitteleuropaeischen Motorwagen Vereins, medio* July.

Don't

ANOTHER INSTALLMENT OF SHORT-METER ADVICE TO THE TYRO—AND THE EXPERT—THE FOLLOWING OF WHICH MAY SAVE THE MOTORIST HEAPS OF TROUBLE, PERHAPS SOME MONEY, AND PROBABLY A LAWSUIT OR TWO

Don't run the motor on a retarded spark; it is damaging to the motor; excess heat is the first manifestation; leaky valves follow; weak performance is the further expectation.

Don't let calcium carbide ash remain in the generator after it has rendered a good night's service; the residuum (ash) is a biting mass that will ruin the generator and compel the purchase of a new one; it takes but a moment to clean out the generator.

Don't expect a raw patch to stay on a tube; it is like a scab; it will fester and peel off.

Don't think that it is an extravagance to purchase a vulcanizer.

Don't have a vulcanizer and not use it; tire-life depends upon care; the latter without a vulcanizer is impossible.

Don't have lubricating oil in such quantity that you can afford to let it drip on the garage floor; it ruins tires. If, through some inadvertence, oil gets on the floor, clean it up before the car is rolled in; one daub of lubricating oil on a tire and it will depreciate perhaps 50 per cent.

Don't fail to place an adequate supply of lubricant in the case with the inner tube in putting a tire on. What is lubricant for tubes? Talcum!

Don't be careless when putting tires on; the inner tube should be carefully inserted; laps are sure to do damage; just take the extra moment to examine the inner tube and see if it is properly in place.

Don't stand in your own light; cheap lubricating oil is the most efficacious means for a high cost of maintenance.

Don't labor under the impression that quantity will suffice for quality when it comes to lubricating oil; make it quality first, last, and all the time.

Don't get the impression that a gallon of good lubricating oil in the "sump" in the lower half of the crankcase will be of any value in keeping a main bearing from freezing; better results will come from a drop of oil on the bearing surface—look after the circulation.

Don't be fooled by the chauffeur who keeps the brass work polished; you can get that work done for a nickel by a bootblack; see that the "man" cleans out the gearcase, crankcase, and other lodging houses for stale lubricant.

Don't handle a squirt-can as if you are trying to put out a fire; clean out the oil-hole and then properly insert the spout of the can in place and make sure that a few drops of the lubricant will reach the surfaces to be lubricated.

Don't forget that lubricating oil wears out just as shoes and other things depreciate in service. Clean out the old oil before putting in new—what's the use of spoiling the new supply and defeating the aim.

Don't forget to take the jack along.

Don't high-gear it to a mud hole in the road; you cannot be sure of the depth of the hole; go slow; use the low gear; that is what it is for.

Don't race down every hill you come to just to get up the impetus necessary to make the facing grade on high gear; what is the matter with using a lower gear on the hill?

Don't forget that trouble hates a systematic man.

Don't persuade a lazy chauffeur to use the seat in your car as a bed to sleep in.

Don't expect to procure all the Cardinal Virtues for $15 per week; a good chauffeur is worth a price.

Don't forget, it is not what a man knows, but what he does, that is worth money. Get a chauffeur that knows less if necessary.

Don't fail to strap the top down to prevent breaking the bows.

Don't lose hub-caps off a wheel and then run the car for a thousand miles without them; caps are placed to keep dust out of the bearings.

Don't ignore a squeaking sound for a moment; it means that some bearing is crying for lubricating oil; it knows what it wants; be accommodating.

Don't let your "profound" knowledge interfere with your success; an absent-minded moment may cost you a crankshaft; there is danger in racing the motor.

Don't run your car week after week without cleaning out the gasoline tank and piping, even down to the carbureter; water accumulates and leads to trouble on the road.

Don't allow yourself to be persuaded that a screen or a chamois skin will abort water trouble; they may be the cause of it.

Don't imagine that the carburetion is perfect just because there is no frost on the intake manifold; poor gasoline may be in use. If so, it will not evaporate until it contacts with the heated cylinder walls, and in this fact may lie the reason for the absence of frost on the surfaces of the intake manifold, and carbon trouble with the motor.

Don't understand that it is desirable to have a frost accumulation on the surface of the intake manifold; far from it, but heat must be supplied to the liquid gasoline in order to vaporize it; this heat should be supplied to the same before it enters the cylinders.

Don't jump to the conclusion that the chauffeur is incompetent just because you have indigestion—his stomach may be in good working order.

Don't be a road hog; you are only one in 90,000,000. If you want a whole road for yourself, build one in your own back yard.

Don't give the repairman *carte blanche* if you only want him to generate a $10 repair bill.

Don't assume too much; the repairman is working for number one; to him, you are number two.

Don't go to a repair shop without having a schedule made of the work to be done; make it clear that you know what you want; stick to the schedule; insist upon getting what you pay for and pay for what you get.

Don't let the repair man mumble the price; there may be a lurking difference; have it put down in black and white.

Don't think that all repair men are robbers; some of them are so honest that they scarcely make both ends meet; it is too bad to have a good repair man go out of business because he does not know how to charge; if you are in the sugar business and sell 15 ounces to the pound, you can afford to treat him liberally, but if you give full measure you will understand his motive.

Don't be surprised if the spare tire that you left exposed to sun and weather for six months proves to be short-lived; tires depreciate when exposed to light as well as to weather; why not purchase a cover and use it?

Don't think that a 25-cent pump will do good work; a large tire pump is a paying investment.

Don't come off the road with your car all splashed up with mud and let it remain on until it forms a dry crust. It will come off, of course, but the varnish will adhere to the mud instead of the car.

Don't start rubbing down the varnished surfaces of the car before the sand is all removed; grindstones are made of sand; you might just as well use a grindstone.

Touching Up and Varnishing

DIRECTIONS FOR THIS WORK BY M. C. HILLICK. SKILLED HANDLING AND PROPER EQUIPMENT ARE REQUIRED

THE car that comes to the paint shop in a slightly soiled and worn condition to be simply touched up and varnished, or to be lightly painted and varnished, as the condition of the surface, upon examination, may suggest, invites careful handling and the best sort of skill to put it in proper shape again at minimum cost.

The first requirement to handle the automobile work economically is a good, light, well-ventilated working space equipped with either a floor pit over which to locate the car, or a couple of strong wooden horses securely bolted to the floor and reached by an inclined runway up which the car can easily be pushed or pulled.

At this elevation anyone can work under the car without much inconvenience. Having located the car so that the parts may be cleaned handily take narrow strips of burlap, say 3 inches, and saturating a small bunch of waste with turpentine proceed to wet up the old crusty accumulations, after which rub smartly with the strips of burlap. Some parts naturally will need, and in fact, must have, more or less scraping with either the putty knife or steel hook scraper in order to start loose and clean off the unusually hard, crusty substances. After the mechanism has been scraped and rubbed clean of the grease and dirt, wash the parts off, as a final cleaning process, with turpentine, and dry off, after a few minutes, with clean strips of burlap. In case a car is received with the parts so unusually crusted over with grease that it cannot be moved with the ordinary medium, start the accumulations with the scraper, and then apply soft soap carrying a small quantity of sal-soda, and use a handful of coarse hair to scour the surface with. The main thing is to get the surface clean before going forward with other operations.

Rub the body surface with pumice stone flour to eliminate dirt specks in the former coats of varnish; also, to flatten out and make the old surface of varnish fit to receive the new supply of paint and varnish.

If the surface discloses a condition which a single coat of varnish will amply renew, and furnish a body of sufficient brilliancy, proceed at once to match some color to the old color, to accomplish which use enough rubbing varnish in the match color to cause it, when applied to the surface, to dry with enough gloss to counteract the natural light-absorbing properties of the new color.

Where the color dries "dead," or without gloss, it invariably absorbs more light than it reflects, with the result that the match is almost certain to be of a different shade—possibly several shades—from the old color. With enough varnish in the match color it undergoes practically no change in drying out, and if mixed to match precisely, or nearly so, the old color, it stays so throughout the drying process. However, at best it is almost next to the impossible to make all colors match up exactly, and the necessity, therefore, of touching as few places as possible, and those places made of a size just sufficient to cover the surface defect, is at once apparent. Assign this work to one of the most skilled as well as one of the most painstaking painters. Moreover, touch only the actual defects. This applies to all parts of the car, body and chassis. In touching up use a small pencil brush, preferably. Give the match color plenty of time in which to dry before varnishing, otherwise not a few colors will be found to show anywhere from two to four, or more, different shades of the same color. Having deftly touched the parts requiring such work, and the touch up spots having dried thoroughly, wash the surface throughout very carefully using a water tool or brush to work about all moldings and carvings, etc., thus removing pulverized pumice stone accumulations, and any other adhesive particles, in fact. With special dusters, dust off all the surface perfectly, after which flow the surface—the body surface first—with a rich, full coat of some wholly trustworthy elastic finishing varnish. Handle the chassis similarly, coating up with all the varnish the surface will safely take care of.

The automobile that shows the surface bitten with minute missiles, with worn patches, and possibly some parts faded and perished quite beyond touching up properly, but which the owner is anxious to have put into presentable appearance at a minimum cost, may be treated about this way: Wash and clean up body and chassis as described in the preceding case. Detach as many of the parts as may be necessary to facilitate operations.

Then with pulverized pumice stone, flour and water rub the surface of the car down uniformly throughout body and chassis, washing thoroughly. Then make choice of some good, opaque, one-coat color, approximating the old color sufficiently to render such color a fit supporting ground for the new, and mixing it with raw linseed oil and turpentine in the proportion of one part oil to eight parts turpentine, apply to the surface using a camel's hair brush for the work.

However, should the surface be fractured and chopped up some with nicks and gouges, before applying the coat of color it should be touched over such surface defects with a bit of lead and color, or with color alone, either pigment containing a dash of raw linseed oil as a binder. The following day putty the cavities and fractures with a hard drying lead putty, made, say, of three parts dry white lead and one part potted whiting worked to the proper consistency in equal parts of brown coach japan and quick drying rubbing varnish. Let this putty stand 24 hours and then level down to the main surface with a block of rubbing brick or stone and water. This brings the surface to a level and uniformly intact condition throughout, and after twelve hours for drying out the color, as already detailed, may be laid on.

On this flat color apply whatever lines of striping the car owner may choose, or delegate you to choose, after which, as quickly as the lines are safely dry, flow on a full, generous coat of heavy body finishing varnish. Brighten up the polished fixtures, renovate the top, if any, and report the job finished.

Should the surface be parched and poverty stricken in the body of varnish, and lacking in capacity to hold out with adequate brilliancy the proposed new coat, it may be necessary to apply a coat of rubbing varnish directly upon the new coat of color, in which case the rubbing varnish should carry a stain of the new color in order to counteract the discoloring property of the varnish.

In due time—this time, of course, depending materially upon the drying conditions of the shop—rub down nicely with pumice stone flour and water, wash perfectly, and finish with the varnish recommended for the one coat varnish method. When the rubbing coat of varnish is used with color in the varnish, apply the striping on the rubbing coat after it has been surfaced with water and pumice stone. If the rubbing varnish is used clear, stripe upon the flat color, thus giving the lines the protection of an extra coat of varnish.

Should any material be applied to the automobile top use it sparingly—the least used, in fact, the better.

Contests on Highways

LEGALITY OF PRE-EMPTING THE HIGHWAY FOR CONTESTS. BY XENOPHON P. HUDDY, LL.B. INCLUDING A DISCUSSION OF OTHER PHASES OF THE MATTER

FOR a number of years automobile speed contests have been held on public highways and also on private courses. Experience has taught that there exists more or less danger connected with automobile racing. It is fitting to inquire if these races are legal. Automobile races tend to show the qualities of the cars participating. These speed contests also afford means of advertising good cars. They constitute what mignt perhaps be termed an excellent sporting event. They also bring business to the community and to the railroads. In considering the advisability of continuing racing of this character the fact that the contestants may be gambled over is not a good argument for abolishing them, since it is possible to gamble concerning anything.

The most serious element entering into automobile racing consists of the danger to life. Are the advantages derived from automobile speed contests on public and private ways greater than the disadvantages? We must concede that in almost every line of human activity and progress the sacrifice of life is inevitable. Our railroads could not be operated without at least a certain number of persons being injured or killed each year. The fact that persons may be injured or killed is no legitimate argument to be advanced for the purpose of discontinuing any particular line of necessary commercial or other activity of great benefit to the public, but in automobile racing are there not features which present very serious consideration in determining whether it should be allowed to exist?

What may the government if it wishes do about automobile racing? The State does not possess authority to prohibit anything it pleases. There exists, especially in the United States, a guarantee of individual freedom and liberty which permits a person to do about as he pleases, if he does not injure either the person or property of another, and if he does not commit any wrong against the public. Prohibitory legislation without reason is illegal, therefore the government cannot arbitrarily command that a particular act must not be done.

The vital legal question concerned in holding automobile speed contests on the public ways consists of two propositions: first, whether a public way can be closed for any length of time for the purpose of holding a speed contest on it and, second, whether such a speed contest does not constitute a public nuisance even though the authorities close the highway under color of authority. We will consider racing on private ways later.

The public avenues of travel were established for certain uses. These uses cover the passing of vehicles, animals, and pedestrians, also they consist of affording a thoroughfare for the placing of telephone and telegraph poles and wires. All these constitute legitimate uses of the public highways, since they are all connected with or in aid of travel, intercourse and communication.

Now, what legal grounds exist for closing the public highways? Manifestly necessary and proper improvements may close a road or street, such as excavations, laying of sewer or water pipes and railroad tracks. So too, a house may be moved through a street and the thoroughfare temporarily may be closed for that purpose, but no longer time than is absolutely necessary to move the house can be taken. The nearest thing which approaches an automobile race, perhaps, is that of a parade, but because parades are educational and inspire patriotism they have been held to be legitimate causes for temporarily closing public avenues of travel.

An automobile speed contest held on the public highways stands in a different position from any of the foregoing. It is not a public necessity, nor is it a public utility. The fundamental theory that a public way may be closed for a public purpose using the same reason that private property may be taken for a public purpose does not apply to automobile racing. An automobile race is not held for a public purpose. It may be said that automobile racing has a tendency to develop and perfect the automobile. If this were the only result such speed contests would be legitimate. The danger, however, which is connected with holding these races, and the closing of the public highways, are sufficient to stamp them as illegal it may be argued. Suppose that one desired to hold a funeral, or suppose a house caught on fire, could the funeral or fire engines be stopped because an automobile race was being held?

The common law on the subject is as follows:

"To operate a vehicle along a public road or street, greatly to the danger and inconvenience of all persons traveling along said highway, is such a wrong as injuriously affects the rights of the public, who are entitled to travel along such public thoroughfare, laid out and kept up by the public for their convenience and accommodation, without exposure to such danger and inconvenience. While any person may drive his vehicle at such speed as he may please, yet, in enjoying the privilege of free use of his property, he has no right to expose others to injury or to infringe upon the rights of the general public. Running and racing a vehicle along a public road, no necessity being shown for such speed, is not the ordinary and proper mode in which such roads are used by prudent men. They were not intended, by the very purpose for which they are opened and kept up, for any such use, but for the ordinary and usual travel of the public.

"To run a race on a public highway or to excessively speed a vehicle, to the danger and inconvenience of people, is a common law misdemeanor. It is to add, that there may be necessity for riding at high speed along even the public road, as in cases of sickness, or to give a neighbor notice of great personal danger to his property. Such necessity is a matter of defense."

Considering the holding of automobile races on private tracks there are difficulties standing in the way of controlling these races by legislation.

Prize-fighting is conducted on private property, but the government has the power to legislate against it, or to control it to a considerable extent. Duelling also which may take place on private property can be prohibited and is prohibited throughout the civilized world excepting one or two places. In fact, any conduct, whether it takes place on private or public property, may be regulated or prohibited if it has a tendency to destroy human life, because it is considered that dangerous acts constitute a wrong against the community and that the people are sufficiently interested in dangerous conduct to prohibit it. It might be argued, what business is it for the people or the government to prohibit a chauffeur from driving a high-powered machine in a speed contest on private property. May I not do as I please with my life and limb? The answer to this question is, no. Self-inflicted injury is illegal. Suicide has always been considered a felony. An attempt to commit suicide is punishable. Of course, for one to knowingly and intentionally engage in a highly dangerous act cannot be placed in the same category as suicide, but where the act has no direct public benefit it can be controlled more or less by legislative action.

In some of the States automobile laws prohibit the holding of speed contests on public highways. No statute has as yet made an attempt to declare it unlawful to race on private ways.

Motor Valves

ABSTRACTS FROM THE THIRD INSTALLMENT OF PAPER BY EUGENE P. BATZELL READ AT SUMMER MEETING OF SOCIETY OF AUTOMOBILE ENGINEERS DEALING WITH SLIDE, ROTARY AND PISTON VS. POPPET VALVES

STILL another type of valve is shown in Fig. 12, designated by the author as a "simple barrel type of rotary valve." In relation to barrel types of rotary valves the author goes on to say: "Cylinder or barrel types of rotary valves also give triangular opening diagrams. The simplest of these is represented in Fig. 12. Here a valve *a* is formed with a straight central passage *b* through which the inlet and exhaust passages communicate with the interior of the cylinder at the proper moment. This valve rotates at 1-4 crankshaft speed. With an inlet of 210 duration the valve channel can occupy at each end an arc of 26 1-4 degrees, if the greatest possible inlet opening is desired. In such a case the inlet port of the cylinder head will also extend over 26 1-4 degrees, and the exhaust port for 225 degrees duration over 30 degrees. For a cylinder of 5-inch bore, the valve could be made about 3 inches in diameter with a channel 4 inches long." The author gives the maximum inlet area as equal to that of the channel passage, or 2.75 square inches. He estimates that this opening will be 25 per cent. larger than that with poppet valves.

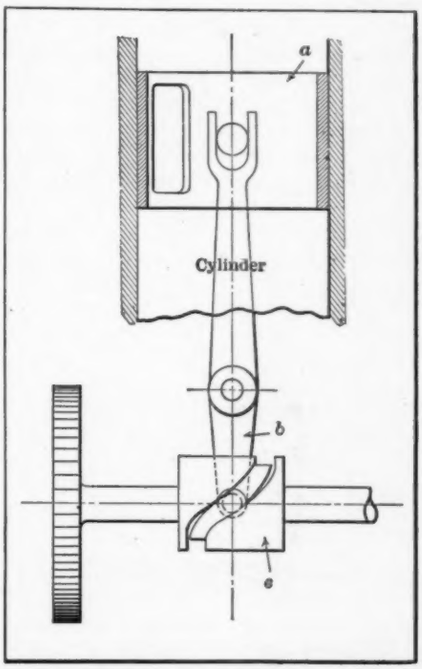


Fig. 13—Cam-operated oscillating valve

Besides a variety of other phases of the valve problem, the author touched upon the question of reversing and throttling motors by means of valves, which represents a phase of the motor building situation that is at present quite foreign to automobile practice. It is nevertheless an interesting angle, and nearly every autoist, at some time or other, has compared the automobile type of internal-combustion motor with steam engines, and regretted that the automobile motor seemed to fall short of the facility offered by steam engines from this point of view. The one redeeming feature lies in the fact that automobile motors do not have to be reversed. The sliding gear transmission system permits of reversing the direction of travel of the car without reversing the motor. In relation to reversing and throttling motors, the author goes on to say: "The motor of a rotary valve system generally can easily be made reversible by reversing the direction of valve rotation, or by changing the moment of the inlet relative to the exhaust, which can be accomplished by an auxiliary valve. An auxiliary valve can be used conveniently also for a throttling means for the motor. Such a valve can be placed between the inlet valve and the cylinder port, so as to alter the size of the opening, or simultanously its size and duration. The inside member of the inlet valve in Fig. 12A serves the last purpose; it does not rotate but can be turned more or less, whereby its channel changes the direction, altering the inlet, timing and opening. However, neither reversibility nor throttling by the valves is to be considered as a feature of rotary-valve systems exclusively. With poppet and other valve systems, these objects can be obtained with as little complication, though in different ways.

"Referring to oscillating valves, similar to those just described as rotary systems, they can also be made with an oscillating motion. With the single valve of this type, proper engine timing will be obtainable only if the valve has an irregular motion, for instance, produced from a cam, etc. This is necessary because the time from the inlet closing to the exhaust opening is much longer than the time from the exhaust closing to the inlet opening. Double oscillating valves registering with each other similar to double sliding valve systems can have a continuous movement from eccentrics, or otherwise. In Fig. 13 a scheme is given of a cam operated oscillating valve. The groove cam *c* transfers motion to the valve *a* through a lever *b*. The valve can have a greater or smaller swing according to the cam size, the leverage, and other things. If it is assumed that the dimensions are such that a 3-4-inch maximum inlet opening is obtained, the diagram of the opening elapsing will depend upon the cam shape. If it is the choice to make the cam so that its developed surface is like the one presented in Fig. 14, the inlet and exhaust periods will be in their proper relation. It will be seen that the valve openings change in size in proportion to the revolving of the cam, but their maximum port openings remain unchanged for a certain period of time. If the valve opening increases and decreases at the same rate, its diagram will be a symmetrical trapezoid as given by curve v_4 in Fig. 4. The maximum port area remains constant for a period of 50 degrees crank motion. The respective theoretical intake gas velocity is

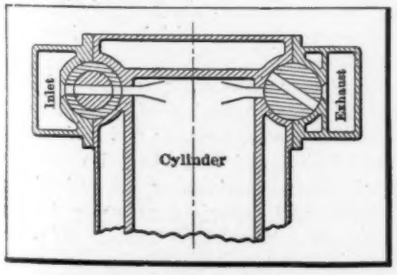


Fig. 12A—Double inlet valve

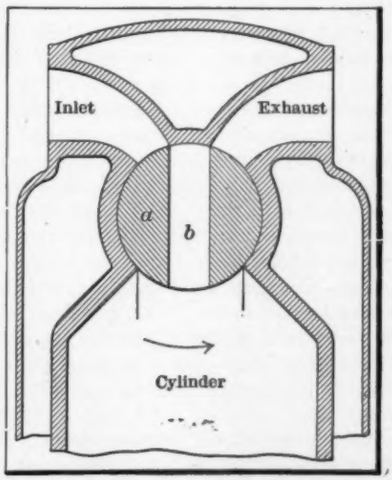


Fig. 12—Simple barrel type of rotary valve

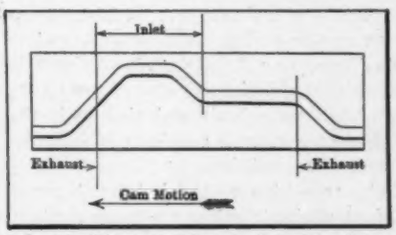


Fig. 14—Diagram of cam for actuating oscillating valves

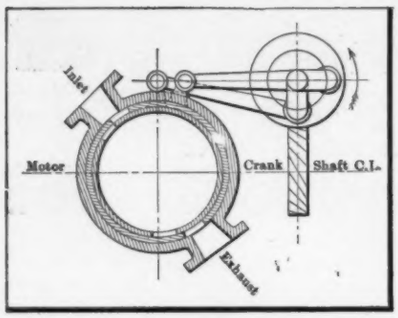


Fig. 15—Horizontal section through motor cylinder, showing oscillating double-valve system

represented in Fig. 4 in curve w_4. This system can be looked upon as being very favorable for motor power, but it still remains to be seen how it can be developed to become of practical value. The comparatively small movement of the valve should also give it some advantages, but, on the other hand, it would probably be difficult to preserve this mechanism from showing backlash, owing to wear in the cam and the pivot. In Fig. 15, which is a horizontal section through the motor cylinder, is shown an oscillating double-valve system with sleeve valves operated by rods from cranks, moving in the horizontal plane. These cranks are rotated from the motor crankshaft by means of a pair of spiral gears. The valve port diagram is obtained in the easiest way graphically. In laying out it is assumed that the radius of the valve crank will be 1 1-2 inches, and that the outer sleeve valve will be actuated from the crank, which revolves 75 degrees ahead of the other one operating the inner sleeve. The maximum inlet port size, counting on the circumference of the inner sleeve, will be found to be 15-16 inch, which gives a total area of 2.625 square inches with a port 2 inches high. The curve resulting from the performance of a motor such as this appears to be practically an equilateral triangle, and as such will result in a theoretical intake gas velocity curve of a shape similar to w_2 in Fig. 4, but of a slightly different scale. The curve v_5 starts and ends more lingeringly than curve v_3 and proves that the generally claimed quick opening of ports by means of a double-valve mechanism operated through eccentrics occurs less quickly than with regularly moving rotary valves. The double oscillating valves of the size assumed here are not noticeably different from the poppet valves in the area enclosed by their diagram curve. The curve v_5 gives a trifle quicker opening start than is obtained with Nos. 1 and 2 (Fig. 1), of the roller cam follower. On the other hand it is less quick than the curve of follower No. 3 (Fig. 1), and besides it is enclosed by all three cam-follower curves during a considerable part of the following crank movement; but it can be concluded that the system after Fig. 15 is more favorable for efficient inlet gas flow than poppet valves having a good shape of inlet port.

"Some other arrangements of oscillating valves are possible besides the one just referred to, for instance, double spherical cap valves are made to fit inside or outside the spherical combustion chamber, the motion for the valves being given through a pair of eccentrics. This system shows the same valve diagram as Fig. 15 and from a theoretical standpoint it is equal.

"Regarding the construction of the valve operating mechanism, hardly any simplification will be noticed in oscillating valves comparatively with poppet valves; gears, shafts with cranks, or eccentrics, rods, bearings, etc., are as well required there. The care required to keep the motor in good shape of course increases with the mechanical complication. If poppet valves are liable to get out of order, the oscillating valves also have peculiarities of construction which will render their correct functions only temporary, nothing being gained in this respect. For instance, places liable to cause trouble in oscillating valves are the cams, the bearings, different joints and pivots, the valve ports themselves, which can burn out, etc. Wear occurring here might result in considerable play of parts, and their correct motion in relation to each other will become changed. In this respect rotary valve systems are different. Their drive through gears and shafts is of a nature where wear is not followed by play or backlash.

(To be continued.)

Industrial Aeroplanes

BY MARIUS C. KRARUP. DESIGNS OF AEROPLANES ARE SHOWN EMBODYING IMPROVED MEANS FOR SECURING EQUILIBRIUM AND SEVERAL NEW DETAILS OF CONSTRUCTION

CARPENTRY and dry goods are elements in aeroplanes which fail to inspire full confidence. The woodwork and the textiles absorb moisture from the atmosphere, expand and contract unexpectedly and, in conjunction with guy wires which refuse to stretch, shift strains from here to there without notice or outward indication. The tangled debris which submits itself to inspection afterwards is eloquently silent. The cause may have been a weakened part, the aviator's blunder or the inherent unreliability of woodwork joints.

Though textiles will probably remain indispensable for a long time yet, the mechanical mind looks forward to an aeroplane machine which shall be a reliable product of the machine shop in all its large responsible features—an industrial aeroplane which may be produced in large number and all alike by industrial methods. So far, constructions conceived under some influence from this idea have been frustrated by the weight limit; they were unable to leave the ground, and in this fatal failure their other merits or defects escaped discussion. It was too much to expect that a design which had been evolved experimentally with woodwork as a basis and piano wires as a source of salvation could be transferred bodily to an imitation wrought in tubing and brazed metallic joints.

The transition to the industrial aeroplane which nevertheless is foreordained, unless the most modern transportation machine shall remain an anomaly in the age which created it, must evidently be accompanied with the changes in design which the changes in material involve. If these changes include an increase in weight per square foot of sustaining areas, as they are likely to do at first, the sustaining capacity of the areas per square foot must somehow be raised. If they include an increase in cost of production, it is reasonable that great care should be employed to develop those possibilities for a ready and instinctive preservation of equilibrium which are known to exist, since they are developed in Nature's fliers, and which constitute the only safeguard against having a considerable value destroyed by a trifling accident.

Even from a purely economical viewpoint, improved means for securing equilibrium must be a prominent feature of the aeroplane which shall be more than a dangerous and fascinating toy. And the sportsman who insists that the dangers of the sport should be reducible in proportion to the skill he employs, can readily concur in this view.

An aeroplane which offers opportunities for an industrial development, one which places the preservation of equilibrium in the hands of the aviator even in severe weather and without too exacting demands for special skill and one whose leading features may be tried out without too sudden or too radical departures from existing design and materials, seems to be one of the necessities of the moment. With these leading and other more or less subordinate considerations in mind, the writer has

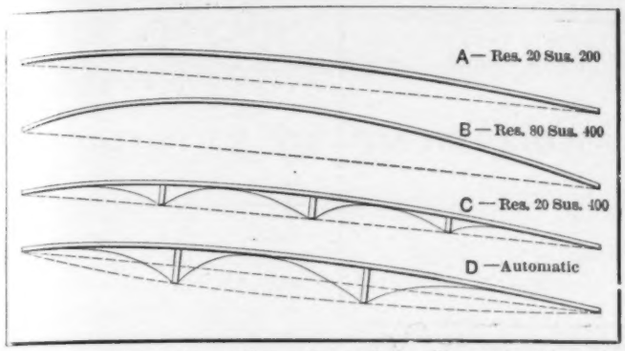


Fig. 1—Diagrammatic sections of aeroplanes illustrating the principle of placing curvature "in series"

developed a design for aeroplanes which, if it does not afford a starting point for a fresh development, should at least suggest some of the possibilities which must be materialized sooner or later. The accompanying drawings show an outline of the main features, and more detailed illustrations of the elements will be shown subsequently.

Certain peculiarities of the planes which may not easily be shown in drawings on a small scale are indicated diagrammatically in Fig. 1. It is known that a plane shaped in section somewhat as Fig. 1A meets with a resistance against propulsion which, at a given tilt and speed, may be denoted by the numerical value of 20, when the value of the sustentation which it affords at the same tilt and speed is denoted by 200. Another plane shaped, in section, somewhat as Fig. 1B meets, at the same tilt and otherwise similar circumstances, with resistance 80 and affords a sustentation of 400. The dimensions of the planes do not influence these relations much, excepting that the fore-and-aft extension should not be much more than one-fifth of the length of the front edge under penalty of excessive irregularity in the pressures created. The relations are in the main decided by the degree of the curvature. Such is, with only the inaccuracy of an extreme brevity, the upshot of the experimental research which has been carried on at various aerodynamic testing stations. The most desirable relation to establish in an aeroplane would of course be the combination of the resistance of A with the sustentation of B, provided the resistance of A is the minimum obtainable and the sustentation of B is the maximum obtainable. This combination may, in accordance with the established data, be effected in a considerable measure by placing the curvature of B "in series" under the general contours of A, as in Fig. 1C. Each of the subdivisions of plane C is thereby made to afford sustentation at the rate of 400, while the resistance, which depends very largely upon the shape of the top surface of the plane, remains essentially at the figure of 20. An uncertain element creeps in, because the air, in passing from under the foremost curvature in the series to the next one and from the second one to the third, is not in the same condition as the air of the atmosphere meeting a single hollow plane of larger fore-and-aft dimensions, and some experimenting is therefore necessary in order to determine what particular succession of curvatures in the series produces the best results. On the other hand, the pressures under, and over, a large plane of single curvature shift, with changes of tilt or wind, from the middle of the plane to an axis of pressures much nearer the front edge, and at very small tilts, below 5 degrees, as well as at tilts exceeding twenty degrees the shifting is sometimes rather violent and unaccountable. By placing the curvature in series the shifting of pressures should be distributed under the sub-curvatures and should be reduced in linear extension in proportion to the number of elements in the series. The arrangement indicated in Fig. 1C should therefore serve to increase the fore-and-aft stability as well as the sustentation for a given propulsive thrust. Finally, the formation indicated in Fig. 1D, in which the chords of the arcs of curvature themselves form a convex pressure surface for the plane in its entirety, should have distinctly self-righting qualities, since any tendency to tip forward or backward will be immediately antagonized by stronger or weaker action of the rear portions of the plane.

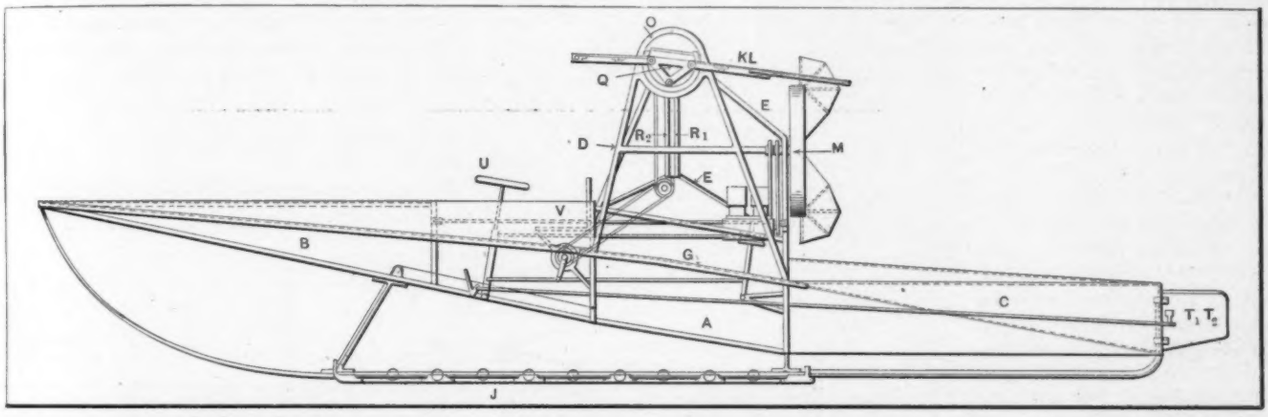


Fig. 2—Side view of machine with large upper adjustable wings and smaller fixed lower wings. A, body; B, prow; C, tail; D, left wing support; E, central control base; F, right wing support; GH, lower wings; J, skid; KL, upper wings; M, propeller; N_1 N_2, control levers; O_1 O_2, guard over trunnioned bearing ring; P_1 P_2, stays; Q, triangulated axis of wings; R_1 R_2, central slides; S_1 S_2, motors; T_1 T_2, oblique rudders; U, steering post; V, seat

In applying the design of Fig. 1C to practice it is found expedient to use the two upper spars in the triangulated axis, Q, of the wings KL, Fig. 2, as means for dividing the surface under the wings into curved sections or shallow air pockets.

In the aeroplanes outlined in the drawings, Figs. 2 to 5, the main upper wings *K* and *L* are designed on the plan of Fig. 1C with flexible and highly resilient sectional rear extensions intended to act as the springs on an automobile in permitting the structure to ride over humps in the road, *alias* sudden gusts, without deflection from its course, the flexible extensions allowing the gusts to pass while their resiliency determines the value of the extensions for sustentation in normal flight. The lower wings *G* and *H* are also designed on this plan but may approach the plan of Fig. 1D and may be without flexible extensions.

In accordance with the conditions for ability to preserve equilibrium, whether the machine is speeding along or the motor is stalled and gravitation is the only force available for propulsion, as these conditions have been analyzed in previous articles, the control is secured through the mobility of the main planes *K* and *L*, and the small oblique rudders T_1 and T_2 at the rear end of the tail surfaces are intended only as a handy means for control in fair weather and an auxiliary for difficult steering and alighting. In order to secure mobility of the planes without an impracticable employment of power, these have been suspended near their middles, where they are mounted in a trunnioned bearing ring admitting of their rotation around their rigid axes

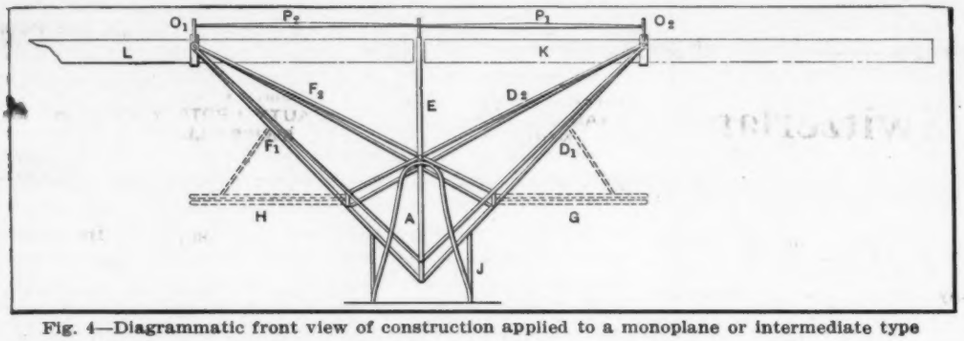


Fig. 4—Diagrammatic front view of construction applied to a monoplane or intermediate type

(formed of three trussed spars, shown as tubes) and also of raising their outer ends while lowering the inner ends, at which the control elements operate. One wing may be turned to a higher tilt while the other is at the same time and by the same control movement turned to a correspondingly lower tilt, or both wings may be tilted higher or lower in one movement. These movements may be accomplished whether the outer ends of one or both of the wings is raised or not.

The control devices serving these purposes consist briefly in two central slides R_1 R_2 in which the inner ends of the wings may slide up and down by means of sliding blocks and universal joints, the blocks being actuated through sprocket chains or equivalent means reaching lock-handles at the right and left sides of the aviator's seat. Two levers N_1 N_2 secured to the universal joints control the tilt of the planes. Their lower ends are held or moved forward or backward between rollers in a cable, one end of which winds on when the other winds off the steering post U, and, when the steering post is tipped forward or backward, both levers are turned correspondingly, thereby turning the planes. The two rear rudders T_1 T_2 placed at a V are actuated through pedals, and their action is accentuated by their position in continuation of the sharp rear edges of the covered tail portion of the structure, where the air displaced by the machine conflues.

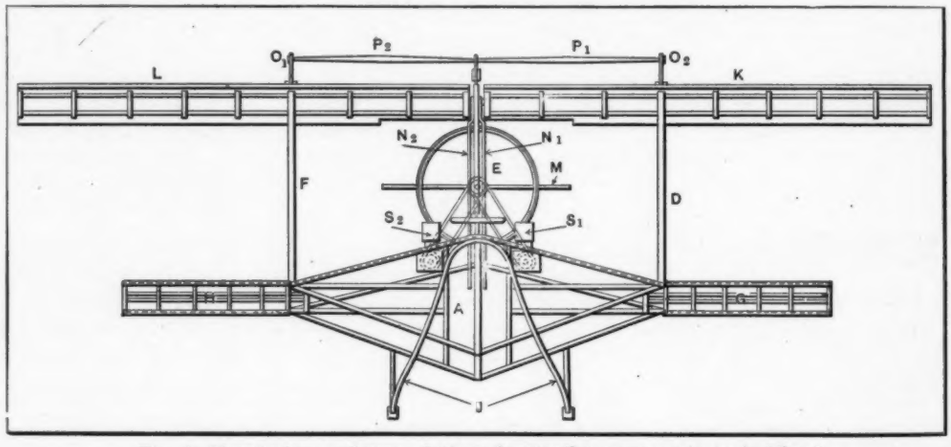


Fig. 3—Front view; reference letters denote the same parts as in Fig. 2

In order to support the planes under their middles, as well as their inner ends, it is necessary to have a rigid central body *A* and the uprights or standards *D*, *E* and *F*, and in order to reduce air resistance against this body, while also utilizing the resistance for sustentation and, withal, having this lower portion of the machine so shaped as to assist in securing a considerable measure of automatic stability, it is necessary to have a prow *B* and a tail *C*. Both prow and tail are covered, and the prow is formed of converging spars of which the upper one is normally horizontal, while the lower ones form supporting triangles with a forward tilt of about fifteen degrees and lateral tilts of about twenty to thirty degrees. The air waves created by the forward movement of the prow are caught under the fixed lower wings *G* and *H*, increasing the sustentation afforded by the latter. The lateral tilts of twenty to thirty degrees represent the range of angles at which a disturbing sidewind or irregular gust has its maximum effect to raise one side of the machine and disturb the balance. An attack upon the equilibrium therefore spends itself in turning the machine into a new position against which the attack has less effect than at first, and a limit for the disturbance is quickly found, so far as lateral disturbances are concerned. The tail *C* is formed in two parts which may be joined at the bottom or split apart (the latter giving easier access to the motors or motor). Each of the parts is bounded by triangular surfaces coming together in an oblique sharp edge at the rear, and between them at the top is formed an air trough facilitating the confluence of displaced air at the rear. The under-surfaces of the tail are about horizontal, in the fore-and-aft direction, so that they do not contribute to sustentation unless the machine is tipped backward. In other words, the prow, body and tail are, in conjunction, of a self-righting formation and contribute much to support when the machine is moving forward either by motor power or gravitation, but their susceptibility to disturbance is much smaller than that of an equal area of wing surface, owing to the lateral tilt and the planity of the surfaces. Much of the faulty equilibrium of biplanes, which is due to the high susceptibility to disturbance of the lower plane and of the rudder elements placed far in front and to the rear of the machine, is therefore remedied without much, if any, sacrifice of sustentation per square foot of surface.

The monoplane type of this design is indicated in outline in Figs. 4 and 5. Here the difficulties in obtaining sufficient surface for the weight to be carried are mechanically greater than in the type shown in Figs. 1 and 2, but on the other hand the stability and equilibrium should be improved. The sketches show the bottom angle of the body sharper than it should be in practice and the body too far removed from the plane of the wings. The control system as well as the formation of prow and tail and wings are the same as in the other type. An intermediate type is indicated in dotted lines, representing lower fixed wings of small area and possibly secured by stays. The propeller and the skids are the leading features which remain to be described.

(To be continued.)

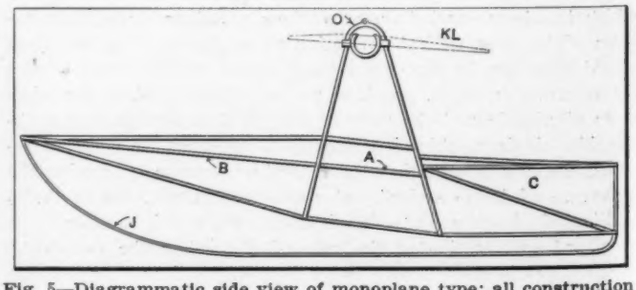


Fig. 5—Diagrammatic side view of monoplane type; all construction details omitted

Touring in Switzerland

THAT COUNTRY IS RAPIDLY BECOMING THE MOTORIST'S PARADISE. SOME OF THE BEAUTY SPOTS VISITED AT THE ANNUAL MEETING OF THE SWISS CLUB

THERE are more motor parties in Switzerland this season than ever before. Automobile tourists from the United States, England, France, Germany and Austria are numerous in the picturesque fastnesses of the Swiss Alps and in contradistinction to other years, there are few complaints of harsh official action or of bad treatment by the populace.

The Government of Switzerland has secured the endorsement of a uniform road code in twenty-one out of the twenty-two cantons and the agreement of the single outside division is looked for in the near future. The result of the active work of President Empeyta, of the Swiss Automobile Club, and his associates is to be seen in the fact that the high road to the Engadine is now open as far as the village of Chur, while formerly motors were halted at Ragaz.

The Swiss mountain roads have a world-wide reputation, not only for their excellence of construction, but even more largely on account of the superb quality and quantity of the mountain scenery.

Automobile parties may start from half a dozen places in France, Italy and Germany and reach the foot hills of the Alps in a day's journey. Favorite starting points are at Nice, Venice, Lyons and Toulon. From Lucerne, nestling close to the rippling bosom of the mountain lake of the same name, the tourists are within striking distance of the grandest of all European natural scenery.

Lucerne, where Swiss Automobile Club held its meeting (railroad station at left, Mount Pilatus in background)

As is shown in the accompanying illustrations, the lordly peaks of Pilatus rise almost from the edge of the waters, towering into the blue in unspeakable majesty.

There is something unreal and fairylike about the Alpine scenery and an impression of the atmosphere may be gained from these remarkable pictures. At a recent meeting of the Swiss Automobile Club, Lucerne was the starting point from which the club members began their tour of the Burgenstock and Engelburg.

Rivaling the Canadian Selkirks in its precipitous grandeur, the Bergenstock and its surrounding country is so accessible that touring automobilists are able to enjoy its wonders with much facility and lately they have been taking advantage of their opportunities.

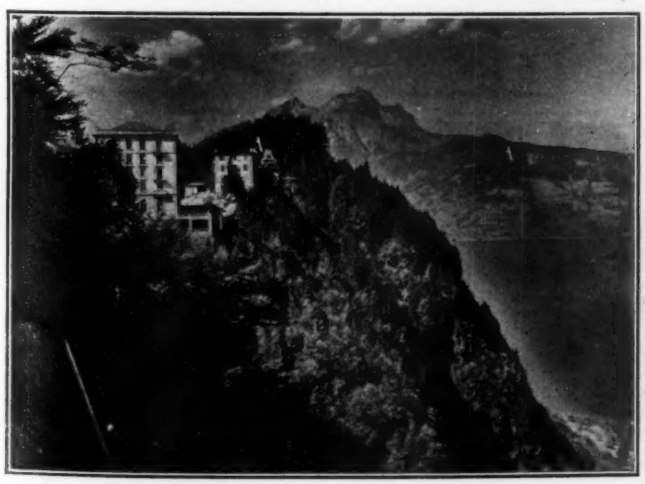
The Engelberg, another peak that bears a striking resemblance to Mount Hood in Oregon, save for the fact that Hood stands practically alone, while the Engelberg is surrounded with sister mountains, was one of the points made on the itinerary of the S. A. C. in its recent tour.

There are dozens of other magnificent short trips to be made in the Swiss Alps and at the rate that section is growing in favor with foreign motorists, the time is at hand when with a uniform road code applying to all the cantons, thousands of automobile parties will be attracted.

The more liberal touring laws in Switzerland have served to turn attention strongly toward that section and as a result the Republic has not been the only gainer. The facility with which the tourist may now proceed in that country has given an impulse to traveling by automobile in contiguous territory, particularly as it applies to Americans.

A number of French tours have proved exceedingly attractive as a foretaste to the scenic grandeur and solid enjoyment of culminating pleasure to be found among the Swiss mountains.

Several of these tours, through the wilder and more mountainous portions of that country have been made by Americans in conjunction with more extended travel.



The Bergenstock, on the Lake of Lucerne, showing the Palace Hotel, which the Swiss Automobile Club visited

Engelberg, in the Valley of the Aar, one of the points on the Swiss Automobile Club's annual tour

Automobile Club of Winnipeg

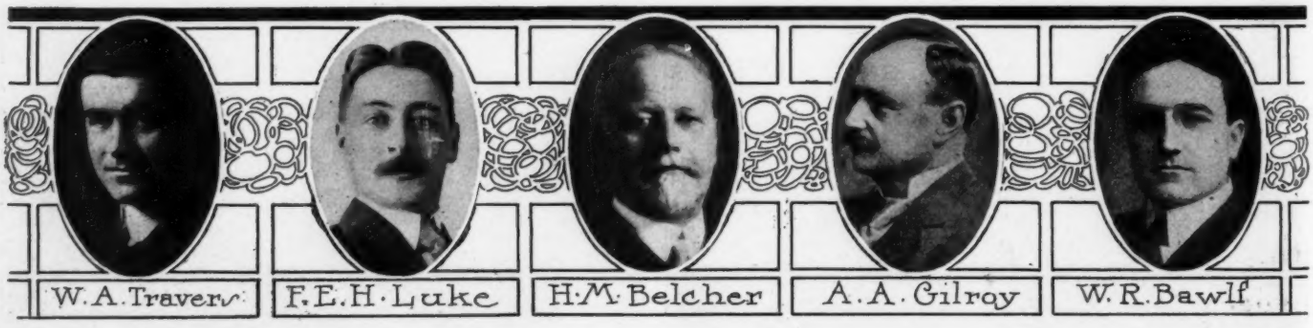
STURDY YOUNG ORGANIZATION OF MANITOBA WHICH HAS DONE MUCH TO POPULARIZE THE AUTOMOBILE THERE

WINNIPEG, MAN., Aug. 15.—Away up in western-central Canada, where motor vehicles traverse the streets for four months of the year in snow, there is an automobile club with a membership of more than 200, and a policy of progressiveness which might be emulated to advantage in more populous centers. This club flourishes in Winnipeg, Manitoba, the gateway city to the Canadian Northwest.

The thought of motoring in comfort, with a temperature far below zero, to a southern tourist is hardly palatable, but up in Winnipeg they revel in the frosty elements and are as ardent auto enthusiasts as can be found on the continent.

Seven years ago there were but twenty power-propelled vehicles coursing the streets of the Northwestern metropolis and most of these were owned by dealers. A few, however, were held by adventurous business men who joined with the dealers in the formation of an automobile club. The object was to centralize the interests of motorists and to inspire confidence in the conveyance which was afterward to supersede the horse.

Country Home of Automobile Club of Winnipeg



Social interests rapidly gained a portion of the club's existence and so rapidly did the automobile business grow that inside of two years special legislation for regulating motor traffic was necessary and the club was active in drawing up this legislation.

From a precarious infancy the club grew rapidly under the management of some of the most capable men of the city, until now, in the strength of its youth, it is accounted one of the best organizations of the kind on the continent and certainly the foremost of Canada. Every question pertaining to the interests of club members is carefully handled by the compact body and at present, although touring and race meetings are occupying a good deal of time, the club is preparing an effort to secure equitable legislation for horse and power vehicles at the next session of the legislature.

It is in the matter of good roads that the club is now most deeply interested. As a factor in building up the highways of the province it has carried the greatest weight. Miles and miles of impassable highways have been turned into good roads by the co-operation of the club with the government and the municipalities. Sign boards giving notice of approaching road difficulties have been erected over many leagues of prairie trail and in some districts the club has at its own expense replaced old wooden road culverts with modern appliances, which do away with many dangerous crossings and make touring more pleasant, not only to motor owners, but all travelers.

The club last year secured and remodeled a club house, 28 miles from the city, to the northwest. A handsome brick building is now equipped with an excellent garage at the rear and has been entirely refitted to meet the requirements of modern motoring. Week end tours to the club are an established feature of the summer season and its patronage during the present month has been so large that extensions are being considered for accommodation. The roads between the city and the club have been particularly well looked after and now less than an hour's spin from the heart of the city will land any ordinary car in the garage at the other end.

The annual club runs have become so popular that it is now proposed to make them semi-annual occurrences. One closed July 5, in which more than 80 autoists participated in a five day run of 507 miles. The distance traversed was not great, but the inspection of the country and the hospitality of the outside points forced the tourists to cut down the distance programme and to return after the tour had been about half completed. It is to complete this run that the members of the club are now proposing to hold a fall tour.

The whole of the west is enthusiastic about the automobile. This year more than 1,000 cars have been disposed of through Winnipeg agencies alone, and of all Western auto centers Winnipeg leads, and the Winnipeg Automobile Club is the parent body of motor owners.

During the past winter almost every car owned in the city was used right through every kind of weather. It was the first winter when motor cars were generally operated. Coupés, limousines and general touring cars with top equipments were run through everything. There was little trouble with frost on the mechanical workings and from the confines of the closed car, traveling was as comfortable as in summer. The members of the club were foremost among the demonstrators of winter possibilities of the automobile. Almost every member of the club drove his car all winter and the few which did remain in the various garages for the most part belonged to owners who were sojourning in other climates.

Among the clubs of the west, the Winnipeg Automobile Club has a very high standing. It is comprised of many of the best men of the city and stands for progressive but not speedy motoring. When the club tours, public receptions are always given by outside points visited and when other clubs tour into Winnipeg, they are royally received by the members of the local club.

The officers of the club are: Patron, Sir Daniel McMillan; honorary president, R. McLeod; president, C. H. Newton; first vice-president, B. D. Sprague; second vice-president, W. L. Parrish; secretary-treasurer, W. E. Wright; executive committee; S. P. Belcher, E. C. Ryan, W. C. Power, F. E. H. Luke, W. R. Bawlf, W. A. T. Sweatman and A. A. Gilroy.

Coming Events

CALENDAR OF FUTURE HAPPENINGS IN THE AUTOMOBILE WORLD THAT WILL HELP THE READER KEEP HIS DATES STRAIGHT—SHOWS, RACES, HILL CLIMBS, ETC.

Dec. 1.....Chicago, Ill., First Annual Aeronautical Exhibition in the Coliseum.
Dec.31-Jan.7, '11.New York City, Grand Central Palace, Eleventh Annual International Automobile Show.
Jan. 7-14, 1911...New York City, Madison Square Garden, Eleventh Annual Show, Pleasure Car Division, Association of Licensed Manufacturers.
Jan. 16-21, 1911..New York City, Madison Square Garden, Eleventh Annual Show, Commercial Division, A. L. A. M.
Jan. 28-Feb. 4, '11..Chicago Coliseum, Tenth Annual National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc., Pleasure Cars and Accessories, Exclusively.
Feb. 6-Feb. 11, '11.Chicago Coliseum, Tenth National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc., Commercial Vehicles, Pleasure Cars, Motorcycles and Accessories.

Races, Hill Climbs, Etc.

Aug. 16-27.....Munsey Tour.
Aug. 19-20.....Brighton Beach, L. I., Twenty-four Hour Race.
Aug. 23.....Cheyenne, Wyo., Track Meet.
Aug. 26-27.....Elgin, Ill., Road Race, Chicago Motor Club of Chicago, Ill.
Aug. 31.....Minnesota State Automobile Association's Reliability Run.
Aug. 31-Sept. 8..Kansas City, Mo., Reliability Run, Auto Club of Kansas City.
Sept. 2-5.....Indianapolis, Ind., Speedway Meet.
Sept. 3-5.....Run and Labor Day Race Meet of North Wildwood Automobile Club.
Sept. 5.....Cheyenne, Wyo., Track Meet.
Sept. 5.....Denver, Col., Road Race, Denver Motor Club.
Sept. 5.....Los Angeles, Cal., Speedway Meet.
Sept. 5-10.....Minneapolis, Minn., Track Meet at State Fair.
Sept. 7-10.....Buffalo N. Y., Reliability Run, A. C. of Buffalo.
Sept. 9-10.....Providence, R. I., Track Meet.
Sept. 10.....Los Angeles, Cal., Mount Baldy Road Race.
Sept. 10.....San Francisco, Cal., Golden Gate Park Road Race, Automobile Club of San Francisco.
Sept. 10-12.....Seattle, Wash., Race Meet.
Sept. 15.....Algonquin, Ill., Annual Hill Climb of Chicago Motor Club.
Sept. 16-26.....Asbury Park, N. J., Aviation Meet, Aero Club of America.
Sept. 17.....Syracuse, N. Y., Track Meet of Automobile Club of Syracuse, Syracuse Automobile Dealers' Association and the New York State Fair Association.
Sept.....Chicago, Commercial Car Reliability Contest of Chicago Automobile Club.
Oct. 1.....Long Island Motor Parkway, Vanderbilt Cup Race, Wheatley and Massapequa Sweepstakes.
Oct. 3.....Louisville, Ky., Reliability Run, Louisville Automobile Club.
Oct. 6-8.....Santa Anna, Cal., Track Meet.
Oct. 7-8.....Los Angeles, Cal., Speedway Meet.
Oct. 8.....Philadelphia, Fairmount Park Race, Quaker City Motor Club.
Oct. 15.....Long Island Motor Parkway, Grand Prize, Automobile Club of America.
Oct. 15-18.....Chicago, Ill., Chicago Motor Club's 1,000-Mile Reliability Run.
Oct. 20-22.....Atlanta, Ga., Speedway Meet.
Oct. 23.....San Francisco, Cal., Road Race, Portola Cup.
Oct. 27-29.....Dallas, Tex., Track Meet.
Nov. 5-6.....New Orleans, La., Track Meet.
Nov. 6-9-13.....San Antonio, Tex., Track Meet.
Nov. 24.....Redlands, Cal., Hill Climb.
Nov. 24.....Savannah, Ga., Road Race, Savannah Automobile Club.

Foreign Shows and Races

May 1—Oct. 1.....Vienna, Austria-Hungary, Automobile and Aviation Exposition.
Aug. 1-Sept. 15...French Industrial Vehicle Trials.
Oct. 15-Nov. 2....Paris, France, Aeronautical Society Show.

THE AUTOMOBILE

Vol. XXIII Thursday, August 18, 1910 No. 7

THE CLASS JOURNAL COMPANY

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A. B. SWETLAND, General Manager
231-241 West 39th Street, New York City

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FRANCE:—L. Baudry de Saunier, offices of "Omnia," 20 Rue Duret, Avenue de la Grande Armee, Paris.
GERMANY:—A. Seydel, Mohrenstrasse 9, Berlin.

Entered at New York, N. Y., as second-class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907

QUALITY, as it is measured in an automobile, is so deep-seated that it escapes the notice of the average purchaser until he finds out after a period of actual service that the repair bill he has to meet is conspicuously below that which is charged up to his neighbor for repairs to a car of another make.

* * *

WHY is it that the average purchaser seems to think that quality is measured by the color of the paint on the body, or the striping of the wheels, or some other exterior "blemish"? Is it not a common statement "Handsome is as handsome does"?

* * *

WHAT is the proper diagnosis of the disease which fastens its fangs upon the man who insists upon "domino" as the brand of sugar for use in his coffee, but who disregards every consideration for quality when he selects an automobile?

* * *

IS is not a fair inference that defects, if there be any, will be covered up by a "swell" appearance? Does a real tailor ever inflict a "swell" suit of clothing upon the attention of a discriminating man?

* * *

JUMPING to the conclusion that an automobile should be measured by the purchase price is a habit that is devoid of a substantial foundation.

THE wonder is that anyone would be so short-sighted as to believe that the rules which govern wise purchasing of every other commodity should be inefficient when applied to the purchase of an automobile.

* * *

PERHAPS it is not too much to say that the quality of an automobile depends upon appropriateness of design in view of the service to be rendered, character of the materials employed in the construction throughout, and skill of the artisans engaged in the work.

* * *

EVERY automobile that will run and continue to do so without a disgruntling cost of upkeep has quality in its makeup to a marked degree, but it may not be the quality that some particular autoist will enjoy.

* * *

CERTAINLY appropriateness must be measured on a gauge based upon the intended service of the car, without disregarding the service expected by the purchaser.

* * *

IF the roads to be traversed indicate that a transmission gear is a necessity, for instance, to disregard the fact and purchase a car not having this facility is to make a grave mistake.

* * *

NEXT to leaving out the sliding gear entirely is the relatively unwise neglect to provide a sliding gear of the character which utilizes a sufficient number of speed changes to properly serve the purpose.

* * *

SINCE everyone knows that an internal combustion motor is not inherently flexible, and its principles demand that it be run more or less on a constant speed basis, what is the use of disregarding the fact that speed changes must be made through the good office of a sliding gear or some other equally efficient auxiliary device?

* * *

LIKEWISE in the several other particulars, the question of quality must be arrived at; but it will be a fallacy to suppose that this quality is abstract in its character and confined to the car. It is not the quality of the car that a buyer should be sure of, but the quality of the service he wants. An automobile that is good for one thing may be useless for another, and yet the quality of the car *per se* may be on a high plane.

* * *

PROGRESS will probably never be made in the attempt to impart useful information of a mechanical character to the non-mechanical mind until the literary surgeon returns to the earth, eliminates superlatives, confines himself to a single subject for a given occasion, and gives clear reasons for his premises. The average writer, desiring to hold an estimable position among his confrères, disdains to tread in the path of simplicity out of fear of ridicule, and misses the target that he aims at, blinded by the smoke of his own lack of clearness. It is a false pride, with nothing of glamor to be gained, but the penalty is sure—the audience snores.

Selden Decree Filed

U. S. CIRCUIT JUDGE HOUGH ENTERS ORDER AGAINST FORD AND PANHARD, REQUIRING THEM TO FILE HEAVY BONDS PENDING FINAL HEARING. PERPETUAL INJUNCTIONS ISSUED

IN accordance with the substantial ideas expressed in the decree submitted to Federal Judge Hough by attorneys for the A. L. A. M., at Narragansett Pier, July 19, the court has signed decrees in the principal suits under the Selden patent. This action was taken rather unexpectedly last Thursday.

The full text of that tentative decree was published in THE AUTOMOBILE at the time and its terms were sweeping and of such breadth as to form a complete basis for future action. The status of the decree is interlocutory and may not be the last word in the litigation. This is all the more probable because the defendants, the Ford Motor Company and the Panhard Company, will undoubtedly take the cause to the Federal Court of Appeals.

The decree holds the Selden patent to be legal and valid and valuable and declares that the rights of the plaintiff under it have been infringed. An injunction is ordered to restrain the manufacture, use and sale of infringing automobiles. But simultaneously with this action, Judge Hough also filed a memorandum opinion covering the contingency of appeal from the order of court. This opinion states that in case the defendant companies decide to perfect their appeal, the injunction shall be raised upon the filing of a bond of $350,000 by the Ford Company and one of $16,000 by the Panhard. The opinion requires that pending a final hearing in the Court of Appeals, the defendants shall file sworn monthly statements of their business.

The only particular in which the foregoing procedure differs from what was outlined at the hearing held at Narragansett Pier is in the amount of the bonds required of the defendants. It was suggested at that time that the bonds be placed at $500,000 for the Ford Company and $50,000 for the other concern.

The original opinion of Judge Hough was filed in the United States Circuit Court last September. The merits of the case were passed upon substantially as they were in the decree of last Thursday, but owing to the fact that the Columbia Motor Car Company, which had succeeded to the rights of the Electric Vehicle Company as lessee under the Selden patent, had not been made party complainant, it was necessary to substitute that company and the process proved to be rather long drawn out.

Following is the memorandum filed by Judge Hough:

UNITED STATES CIRCUIT COURT, SOUTHERN DISTRICT OF NEW YORK.

Columbia Motor Car Company and George B. Selden, Complainants, vs. C. A. Duerr & Co. et al., O. J. Gude Co., John Wanamaker, et al., André Massenet, et al., Henry Neubauer, et al., Defendants.

On settlement of final decree.

MEMORANDUM.

I.—Upon a fair reading of the entire bill in equity it does not seem to me to be true that the sole cause of action set up in the bill is for joint infringement. In the typical case against the Ford Motor Company the bill as a whole shows distinctly that the Ford Company was engaged in selling within the Southern District of New York through Duerr & Company, and that Duerr & Company were in some way the agents of the principal defendant. The allegations of confederation and conspiracy must be read in conjunction with the basic fact of agency.

Infringement has been found by both defendants on an issue deliberately tendered in defendant's answer which denied infringement by the defendants both jointly and severally. The principal defendant having tendered this issue itself does not seem to me to be in a position now to insist on so narrow a view of the pleadings—a view, however, which apart from the answer I am unable to take.

II.—Without an assignment or transfer made in accordance with the requirements of the various patent acts I do not think that the legal title to a patent passes to a receiver. Undoubtedly he has the equitable title, and he may by equitable process compel an assignment; but it does not appear that this was ever done with respect to the patent in suit. In my opinion the action was originally brought in the name of the proper parties.

III.—Under the established practice in this Circuit I do not think that complainants can insist upon terms of suspending the injunction more severe than this: They should have a bond in the sum sufficient to secure the payment of such a recovery as now seems allowable, and they should also have sworn information furnished monthly of the business transactions during the preceding month in machines infringing under the decision filed herein.

The proper amount to be fixed for this bond is a point which might be much discussed; but such discussion could not be had without revealing the affairs of the defendants in a manner which under the practice I have alluded to seems to me improper. Suffice it to say that comparing the information furnished me by defendants' counsel with the impressions of complainants (as stated in argument) there is a much smaller difference than I expected to find. It is to be remembered that a very large part of either the list or selling price of many, if not most, automobiles includes accessories having no relation to Mr. Selden's patent. Upon the whole I think it would be just to require from the Ford Motor Company a bond, in a form to be settled upon notice if not agreed upon, in the sum of $350,000, and from the Panhard Company a similar bond in the sum of $16,000.

The reports of sales are to be filed with the clerk of the Circuit Court, to be by him deposited in a safe place to which the public shall not have access; notification of the time of filing is to be served on complainants, who shall be entitled to examine the same upon the order of a Judge duly authorized to sit in the Circuit Court of the United States for the Southern District of New York. Upon filing the bonds above described an order may be entered suspending injunction in the cases of the Ford Motor Company and the Panhard Company pending appeal, which order will contain the provisions above indicated in relation to the filing of reports. Final decrees in all of the cases above enumerated are signed and placed in the hands of the clerk this day.

August 11, 1910. C. M. HOUGH, D. J.

(Endorsed) U. S. Circuit Court, Southern District New York. Filed August 11, 1910. John A. Shields, Clerk.

Perpetual injunctions restraining John Wanamaker, Thomas B. Wanamaker, L. Rodman Wanamaker, Robert C. Ogden, The O. J. Gude Company, Henry Neubauer and Albert C. Neubauer from infringing upon the Selden Automobile Patent were issued by the United States Circuit Court for the Southern District of New York on Saturday.

Wanamaker formerly handled the Ford car as a dealer, the Gude Company were users of unlicensed cars, while the Neubauers acted as agents for a line of unlicensed imported cars.

The injunctions were issued under Judge Hough's recent decision and under the provision of the decrees in suits brought against these parties, in which he sustained the Selden Patent, granted the injunctions and also accountings of damages and profits.

The injunctions, which were personally served by U. S. Marshal Henkel on John Wanamaker, the firm of John Wanamaker and the O. J. Gude Company, command all of the defendants as well as their associates, officers and agents under penalties, in case of disobedience, to immediately and until the expiration of the Selden Patent,

> "desist from, directly or indirectly, making or causing to be made, using or causing to be used, or offering or advertising for sale or causing to be offered or advertised for sale or importing or causing to be imported, or selling or causing to be sold to others in any manner, or disposing of in any way within the United States any road engines, vehicles, automobiles, devices or apparatus containing or embodying or employing any of the inventions described in said letters patent and claimed in the said first, second and fifth claims thereof, or substantial or material parts thereof, or from infringing said claims of said letters patent in any way whatsoever."

Under the provisions of these injunctions the parties enjoined cannot directly or indirectly make, offer or advertise for sale, sell, use, import or dispose of any gasoline automobiles in infringement of the Selden Patent, without violating the injunction and being liable to punishment as for contempt of court.

Program at Elgin

FOUR RACES TO BE RUN OFF OVER THE NEW COURSE OF THE CHICAGO MOTOR CLUB ON AUGUST 26-27. ENTRY LIST PROMISES TO BE VERY LARGE

CHICAGO, Aug. 15—The program to be run off over the new course laid out just west of the city of Elgin, August 26-27, under the auspices of the Chicago Motor Club, includes four events. All four are for stock cars under the strict interpretation of the rule. The fields in each of the events will be large and representative, according to the entries so far made. While the list will not be closed until August 20, the present indications point to a total entry of about forty cars.

The course has been repaired and improved with painstaking thoroughness, and at present half a dozen of the entered cars are engaged in daily practice upon it.

The first race is limited to Class B, division 2B, cars having a piston displacement of from 161 to 230 cubic inches. The trophy is called the Fox River Valley emblem, and a typical entry list has been received, which will probably be augmented by several additional contestants. The minimum weight of entrants in this class is fixed at 1,400 pounds. The distance will be sixteen times around the course, which is 8 1-2 miles, or about 135 miles. In addition to the trophy, a purse of $300 will also be awarded to the winner. The Fox River trophy becomes the absolute property of the winning entrant.

The second race is for the Kane County trophy and a similar purse. The cars are those of Class B, division 3B, of 231-300 cubic inches piston displacement. Minimum weight is 1,700 pounds, and the distance, twenty laps of the course, or about 170 miles. This trophy becomes the permanent property of the winner.

The third race, and the final one for the first day's sport, is for cars of Class B, division 4B, 301-450 cubic inches displacement, of a minimum weight of 2,000 pounds, and the distance is twenty-four laps, or about 204 miles. The trophy, which will become the property of the winner, is called the Illinois trophy. In addition the winner will receive $400.

On Saturday, August 27, the only contest carded is the race for the Elgin National trophy. This will be the star event of the meeting and is open to stripped chassis in Class B with a piston displacement of under 600 cubic inches and a minimum weight of 2,300 pounds.

The Elgin National trophy does not become the outright property of the winner, but under the terms of the race it will be held by the winner for one year. But along with the cup will go $1,000 to the successful entrant. The second car will be awarded $300 and the third $200.

The lists do not close until next Saturday night, but already 26 cars are entered, while there are hanging fire enough more to bring the grand total up to at least forty.

As matters stand right now the Chicago Motor Club has a most representative field in, which includes most of the best drivers in this country. In Harroun, Dawson, Grant and Mulford they have four drivers who have won their spurs at long distance racing and whose struggles for the $4,500 trophy in the big race should be worth going miles to see. Hearne is another star who will be in; he will officiate at the wheel of a Benz. Oldfield also will be in the galaxy, while nearly every other man is well known in the racing game.

With everything running smoothly in the entry line, the Motor Club is putting forth its best efforts toward having the course in readiness for the struggles. The contractors have not been doing as well as they expected because of the lack of rain, water being a necessity in order to bind the gravel and clay that have been dumped on the soft spots on the south leg of the course. Because of this delay it will not be possible for the training to begin before Monday hardly, although it was expected the drivers and cars could get to going by the middle of the week. When training does start the men will be allowed the freedom of the circuit from 11 a. m. to 2 p. m. each day, while the racing each day will start at 10 o'clock.

Already most of the teams have engaged quarters at the course, and the Marmon, National, Cino, Lozier, Cole and Falcar are now awaiting the chance to begin training.

The Motor Club has secured the Warner timing apparatus to time the races, the first time this has been had for a road race.

With the exception of the Elgin National Trophy race, all the cars are of 1910 design, with four-cylinder engines. In the big event the Lozier and the Matheson are 1911 models, and the Alco harks back to 1909. The Matheson and the Alco are the only six-cylinder cars. Following is a list of the entries:

FOX RIVER TROPHY

Car	Entrant	Bore	Str.	Driver
Ford	Ford Motor Co.	3¾	4¼	Kulick
Cole	Cole M. C. Co	4	4	Endicott
Staver-Chic.	Staver Car. Co.	4	4	Cheney
Staver-Chic.	Staver Car. Co.	4	4	Monkmeier
Benz				Hearne

KANE COUNTY TROPHY

Marmon	N. & M. Co.	4	4½	Dawson
Marmon	N. & M. Co.	4	4½	Buck
Cino	Haberer & Co.	4⅜	5	Fritz
Overland	Overland Mot. Co.	4¼	4¼	Schillo
Kisselkar	H. P. Branstetter	4¼	4¼	Endicott
Corbin				Matson

ILLINOIS TROPHY

National	A. W. Greiner	5	5 11/16	Greiner
National	National Auto. Co.	5	5 11/16	Livingstone
Marmon	N. & M. Co.	4½	5	Harroun
Falcar	Fal Motor Co.	4⅛	5¼	Pearce
Falcar	Fal Motor Co.	4⅛	5¼	Gelnaw
Kisselkar	H. P. Branstetter	4⅜	4¾	Schoeneck
Midland	Midland M. Co.	4½	5	Ireland

ELGIN NATIONAL TROPHY

National	A. W. Greiner	5	5 11/16	Greiner
National	National Auto. Co.	5	5 11/16	Livingstone
Marmon	N. & M. Co.	4½	5	Dawson
Marmon	N. & M. Co.	4½	5	Harroun
Lozier	Lozier Motor Co.	4	5⅜	Mulford
Matheson	Matheson Auto. Co.	4½	5	Reynolds
Alco	American Loco. Co.	4½	5⅜	Grant
Simplex	L. A. Shadburne	5¾	5¾	Saynor
Kisselkar	H. P. Branstetter	4⅜	4¾	Schoeneck
Black Crow	Black Mfg. Co.	4 5/16	4⅞	Stinson
Knox Six				Oldfield
Jackson				Schieffler
Simplex				Robertson

Norristown Club to Promote a Track Meet

NORRISTOWN, PA., Aug. 15—The Norristown Automobile Club has arranged a comprehensive program of events for its race meet to be held at the Belmont Driving Club's track, Narberth, on September 24. In addition to the big race of the day, a match race between a Simplex and a Fiat, best two out of three 5-mile heats, the following list is announced:

1—Class B, Division 8, 5 miles, open to any gasoline stock chassis with a piston displacement of 161 to 230 cubic inches.
2—Class B, Division 2, 5 miles, open to any gasoline stock chassis, piston displacement 301 to 450 cubic inches.
3—Class B, Division 5, open to any gasoline stock chassis, piston displacement 451 to 600 cubic inches.
4—Class B, Division 2, 10 miles, open to any gasoline stock chassis, piston displacement 161 to 230 cubic inches.
5—Class B, Division 4, 10 miles, open to any gasoline stock chassis, piston displacement 301 to 450 cubic inches.
6—Class B, Division 5, 10 miles, open to any gasoline stock chassis, piston displacement 451 to 600 cubic inches.
7—Free-for-all handicap, 5 miles, open to cars of all types and motive powers. First prize, $100; second, $50.
8—Free-for-all handicap, 10 miles. Prizes same as in No. 7.
9—One-mile record trials. Prize, cup.
10—Amateur handicap, 5 miles. Prizes, cups to first and second cars.

In the first six events the prizes will be: First, $50; second, $25.

In order to assure accuracy in timing to establish records for the course, the times will be clocked automatically.

Detroit Doings

NEWS OF THE WEEK FROM THE AUTOMOBILE MANUFACTURING CAPITAL OF THE COUNTRY—NEW COMPANIES ORGANIZED AND OLD ONES REORGANIZED; NEW FACTORIES GOING UP; TRADE CHANGES, ETC.

DETROIT, MICH., Aug. 15—Since Jan. 1, the records of the Secretary of State show 92 new motor car and parts companies have been organized in Michigan and nearly 75 per cent. of these are located in Detroit. This is at the rate of three new companies per week. To be more explicit, there were 49 motor car companies and 43 parts companies, and of these Detroit contributed 36 and 30 respectively. The capital stock represented is $6,822,500, of which Detroit's share is $4,503.000. These figures do not include corporations organized previous to Jan. 1, 1910, that have increased their capitalization since that date.

The 36 new motor car companies organized in Detroit during this eight-month period have a combined capitalization of $3,432,000, and many of them are actively engaged in turning out cars. The other 13 companies are distributed as follows: Two in Mt. Clemens and one each in Birmingham, Bad Axe, Port Huron, Kalamazoo, Owosso, Ionia, Gaylord, Alpena, Niles, Ann Arbor and Saginaw. The 30 parts manufacturing concerns organized in this city have a combined capital stock of $1,071,000. Of those outside Detroit, Lansing gets three, Jackson two and Battle Creek, Flint, Ludington, Port Huron, Wyandotte, Muskegon, Hastings and Rochester one each. The outside car makers are credited with a total capitalization of $1,589,500 and the parts makers with a $730,000 investment.

Reorganization of the Anhut Motor Car Co. under the name of the Barnes Motor Car Co., which has been in contemplation several weeks, was effected at a meeting of the stockholders last Friday afternoon. The capitalization is $300,000, of which $225,000 is common and $75,000 preferred stock. William M. Walker will continue as president and will take a more active part in the affairs of the company than formerly. Creditors have granted an extension of 18 months and Mr. Walker hopes to have the business on a solid foundation by the end of that period. For the 1911 trade the company will manufacture a six-cylinder car to sell at $2,250 and a four-cylinder car to sell at $1,400. The reorganized concern takes its name from Henry C. Barnes, the factory superintendent. He was formerly with the Overland Co. Charles E. Henkel is secretary and treasurer of the Barnes Co. There is no change in the directorate.

In the readjustment, Senator John N. Anhut, former president of the company, with whom the officers have had some trouble over the disposition of stock, was left out of consideration. He will no longer have any active connection with the company, it is said. Anhut, whose continued absence from the city has given rise to numerous stories and whose whereabouts have been something of a mystery, has finally been located in Europe. In a letter to a friend he explains that he went away for a rest preliminary to his campaign for re-nomination as State Senator from this district and incidentally to meet his sweetheart. He expects to return home about Sept. 1.

Building permits have been taken out for a $14,000 addition to the Warren Motor Car Co.'s plant, extending the length of the main building, which is two stories high and 60 feet wide, from 280 to 600 feet. This addition, together with two new buildings to be erected by the same company on Holden avenue, between Brooklyn and Lincoln avenues, will more than double its present capacity. The estimated cost of the two new structures is about $27,000, according to the permits.

The Hupp industrial group in the Fairview district is beginning to assume stupendous proportions. The "family circle" now comprises the Hupp-Turner Machine Co., the Hupp-James-Halloran Foundry Co. and the Hupp-Johnson Forge Co., all of which are operating in new buildings. They will be joined presently by the Rotary Valve Motor Co., which is building a six-cylinder car with a new and practical engine, and the Hupp Yeats Co., which is soon to put out an electric coupé. Buildings for the accommodation of these last named concerns are nearing completion. It is the intention later on to provide quarters in the same group for the Hupp-Ellis-Rutley Construction Co. and the Hupp-Detloff Pattern Co. Robert C. Hupp, who is prominently identified with all these companies, holds the title to the land which constitutes the site, comprising 53 acres.

News that Judge Hough had handed down his decree in the Selden patent case failed to create even a ripple of excitement among the officers of the Ford Motor Co. here. Henry Ford betook himself to his country home hours before the battery of reporters and correspondents descended on the plant. In his absence, James Couzens, secretary and treasurer of the Ford Co., talked freely.

"It is a decree that should have been rendered 11 months ago," said he, "but it has taken the Columbia Motor Car Co. that length of time to establish its title to the patent. No injunction will be issued restraining us from manufacturing cars. We have already prepared an appeal to the higher court and in place of the $350,000 bond required we are planning to put up the cold cash. The case has been noticed for hearing some time in October and we are in hopes that it can be disposed of before Christmas. In the meantime the Ford Motor Co. will keep right on turning out cars."

The E-M-F Co. announces the appointment of Charles F. Garaghty as assistant to the treasurer of the company. Mr. Garaghty also will take charge of the repair, parts and claims departments and will have special duties to perform in connection with the commercial department. H. A. Mitchell has tendered his resignation as assistant advertising manager of the Abbott Motor Car Co. to accept a position in the engineering department of the Hudson Motor Car Co.

Oct. 1 is the date set for the beginning of manufacturing operations in the Lozier Motor Co.'s mammoth Detroit plant. After that date complete cars will be turned out only in the local factory, it is announced, while the Plattsburg, N. Y., plant will specialize on parts.

Charles E. Baker, Charles H. Gowin and Charles J. Stokes, all of Cheboygan, Mich., have formed the Warren-Detroit Garage & Sales Company and took over the garage and salesroom at 736-740 Woodward avenue, formerly occupied as the local sales branch of the Winton Company. They will be State distributors for the Warren-Detroit "30."

Plans are about completed for the two-story garage and salesroom to be erected for the Michigan Buick Auto Company on Woodward avenue. The building will be of brick and stone.

The Michigan Motor Car Manufacturing Company, at a recent meeting, decided to increase its capital stock to $100,000.

Another new corporation that will soon make its bow is the Detroit Airless Tire & Rubber Company. The organization plans have been under way for several weeks and are now nearing completion. The persons interested have been making airless tires on a small scale in Dayton, O., but the enterprise will be removed to this city as soon as the present plans are perfected.

The newly-organized Lion Motor Sales Company filed articles of association with the Wayne county clerk Wednesday. Fred Postal, proprietor of the Griswold House, holds all but two shares of the capital stock of $10,000, all of which has been paid in. The holders of the other two shares are Robert L. Fee and Harry F. Postal.

Omaha's First Home-Built Car Arrives

OMAHA, NEB., Aug. 15—The first Omaha manufactured motor cars were put on the market last week and one or two are already being driven around the streets of this city. They are products of the Rogers Motor Car Company. The new car is designed for business purposes and is in the line of a delivery wagon. Driving on rough country roads has been kept in view by the manufacturers and the employment of a flexible wood frame, a novel type of transmission and scientific adjustment of springs, has produced a vehicle which is wonderfully easy riding and which works remarkably smooth with hard tires. The Rogers Company has a factory with a capacity of 500 cars a year and this will be the output for 1911.

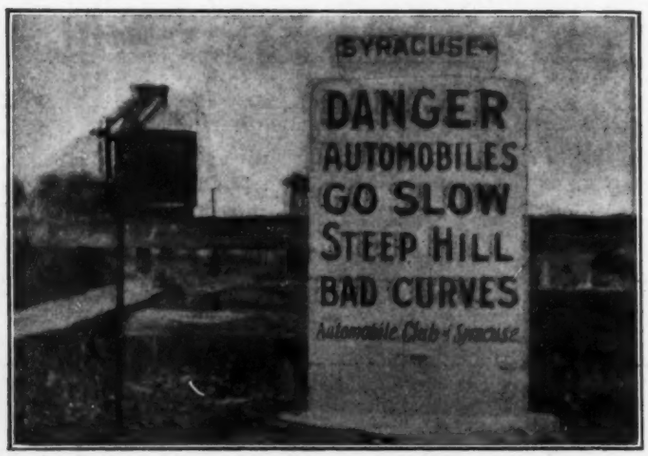
Auto row in Omaha is undergoing a transformation by reason of the recent additions to the ranks of the auto dealers and agencies. Among the recent acquisitions are the handsome new garages of the Van Brunt Automobile Company, the Maxwell-Briscoe branch, the Stanley steamer, the Paxton Mitchell, the Cadillac Company of Omaha and the partially completed building of the Ford branch. The E-M-F which has a branch here is expected to open shortly in its handsome new home.

Syracuse Club Guards Tourists

SYRACUSE, N. Y., Aug. 15—The Automobile Club of Syracuse has set an example for similar organizations the country over, in safeguarding motor tourists and the general driving public. Upon the West Camillus hill near this city, one of the most dangerous in the State, they have a warning sign for day and night, as it is equipped with a lantern, as shown in the accompanying illustration. The sign is at the foot of the first gradual descent, coming east toward Syracuse, and near the first bad right hand curve. The hill is three-quarters of a mile long and full of twists and turns. An automobilist was killed upon it through his machine being ditched three years ago and there have been many accidents resulting in injuries. The hill is a part of the main highway across the State and is traversed by numberless tourists.

For several years the Syracuse club had the hill boarded, but because of the increased travel of tourists, the officers hit upon this novel scheme. The sign is of cement stone, built by the club, and the light is arranged so as to show a green glare clear from the top of the hill. The headlights of the cars shine directly upon the lettering as the machines come toward it, and if they are not lighted a white light from the lantern serves the purpose.

North of this sign there is another branch of the road running toward Warners, and upon this branch a red light serves to warn tourists of the hill. The club engages a man the year round to care for the sign, replenishing and lighting the lanterns, etc.



Stone warning sign erected on bad hill by Syracuse clubmen

S.A.E. Membership Nearing 400 Mark

The Society of Automobile Engineers membership will soon pass the 400 mark. The following members and associates were elected last week: Thomas W. Warner (Warner Mfg. Co.), Frank H. Trego (Hudson Motor Car Co.), Elliott J. Stoddard, Detroit, Mich., W. Rexford Smith (Warner Mfg. Co.), Charles F. Splitdorf, New York City, Alfred J. Poole, New York City, Matthew B. Morgan (Chalmers Motor Co.), James McIntosh (Hercules Motor Truck & Car Co.), Harry Le Van Horning (Waukesha Motor Co.), F. G. Hughes (Driggs-Seabury Ordinance Corp.), O. C. Friend (Mitchell Lewis Motor Co.), F. C. Frank (General Motors Co.), George Dorris (Dorris Motor Car Co.), John Demmler (Clark Power Wagon Co.), Arthur Dugrey (Holly Bros. Co.), Hugh Chalmers (Chalmers Motor Co.), Eugene P. Batzell (Speedwell Motor Car Co.), Guido G. Behn (Hudson Motor Car Co.), Joseph K. White (French Steel Products Co.), Charles D. Shain, New York City, H. J. Porter (J. S. Bretz Co.), Duncan McConnell (Lovell-McConnell Mfg. Co.), Kenneth B. MacDonald (E. R. Thomas Motor Co.), Charles W. Hatch (Perfection Spring Co.), J. H. Friedenwald, Baltimore, Md., John Craig (Standard Metalwork Co.), Harry G. Baldwin (W. A. Wood Mfg. Co.), Noble C. Banks (Gear Grinding Machine Co.), William M. Barr (Lumen Bearing Co.), R. Frank Bower (Bower Roller Bearing Co.), Benjamin Byron Bachman (The Autocar Co.).

Cannot Exact Inspection Fees for Factory Gasoline

MILWAUKEE, WIS., Aug. 15—The Thomas B. Jeffery Co. of Kenosha, Wis., maker of the Rambler, has won the case brought by the state inspector of oils of Wisconsin, involving the right of the inspector to inspect the gasoline purchased by the motor car company. The municipal court at Kenosha decided that the State cannot force inspection of oil when it is brought into the State and used for the purposes of a concern like the Jeffery company. The limit of apppeal has now expired, which makes the Jeffery victory complete, as no appeal has been made by the inspector. The Kenosha concern buys large quantities of gasoline annually and refused to permit the inspector to inspect it and charge the usual fee because the gasoline is not placed on sale but reserved for its own use. The inspector brought suit to collect the fees. Several cases involving the constitutionality of the law have been brought in other courts of Wisconsin and all are at variance with each other. The Supreme Court has had no opportunity to rule upon it, the nearest approach being this case at Kenosha, which is now closed by the failure to appeal within the prescribed time.

Cullings from Cleveland Motor Field

CLEVELAND, Aug. 15—The Consolidated Motor Car Company, of Cleveland, $4,000,000 capital stock, to manufacture automobiles, etc., was incorporated recently by G. A. Howells, L. R. Canfield, Thomas D. Russell, J. L. Bradley and Ralph Blue. The capital stock is in equal shares of common and preferred. The incorporators are Cleveland business men and attorneys. The concern will be one of the largest in the city, it is stated, and it is expected that ground will be broken for the factory building in or near the city at an early date.

The stockholders of the Goodyear Tire & Rubber Company, of Akron, held a special meeting Monday and confirmed the report of the directors to increase the capital stock from $2,000,000 to $6,000,000. The increase will be entirely in the common stock. The directors offer the stockholders for 10 days the right to subscribe for $500,000 preferred stock and $250,000 common, but the stock not taken up at that time will be offered to the public. The directors declared a cash dividend of 12 per cent. and 100 per cent. stock out of the surplus earnings to the common stockholders and to provide for the funds necessary to take care of extensions now being made to the plant so as not to impair working capital.

Jersey Motorists Given a Chance in Bay State

BOSTON, MASS., Aug. 13—To enable New Jersey motorists who are in the White mountains to cross the Bay State without being arrested, and also to enable those about to cross Massachusetts on the way north to go through all right, the Massachusetts highway commission has authorized the various police chiefs in Springfield, Pittsfield, North Attleboro, Lowell, Newburyport and Greenfield to issue licenses to the visitors and collect the fees so that a trip to Boston may not be necessary. A number of New Jersey motorists have been arrested in Massachusetts for not being registered in the Bay State, and some of them stated that they were on the way to Boston to register their cars and that it was not fair to hold them up. It was decided by the commission that it would be only fair to give the visitors a chance and so the police chiefs will do the work.

San Francisco Dealers Organize

SAN FRANCISCO, Aug. 10—The effort to organize a Motor Car Dealers' Association in San Francisco appears to be meeting with some success, notwithstanding the discouraging experience of last month. At the meeting held July 21 new officers were elected, as follows: J. A. Marsh, president; Cuyler Lee, vice-president; C. S. Richardson, secretary; and I. J. Morse, treasurer. The board of directors is composed of E. P. Brinegar, H. L. Owesney, J. W. Leavitt, W. L. Hughson and A. E. Hunter. The failure of the former effort was largely due to differences of opinion as to admitting the accessory dealers into the organization. The new association is composed entirely of dealers, agents and factory representatives, the accessory trade being excluded. The second meeting, at which the constitution and by-laws were submitted, was held last Monday noon, when good progress was made toward getting the organization on a permanent basis, and the local dealers feel assured that this time they will be able to accomplish something definite through united action.

Fifty Entries for Omaha "World-Herald" Run

OMAHA, NEB., Aug. 15—Fifty entries are assured in the *World-Herald* endurance automobile run which is scheduled for August 24-26 through western Iowa and eastern Nebraska. While the Omaha Motor Club, under whose auspices the run will be made, has not formally affiliated itself with the A. A. A., the run will be given under the sanction of that organization.

Five trophies are to be awarded: The grand prize silver trophy by the Omaha *World-Herald* for the car having the best score; a second prize by the Omaha Motor Club for the second best score and three other trophies in each of the three classes.

The cars are divided into the following classes: First, cars selling for $800 or less; second, cars selling for $801 to $1,600; third, cars selling above $1,600. Cars in the first class will travel at an average rate of speed of sixteen miles an hour; second class, eighteen miles an hour; third class, twenty miles an hour. Otto Nestman is in direct charge of the run.

The first day's run is over into Iowa, lunch at Shenandoah, back through Nebraska City to the night control at Lincoln. The second day's run is from Lincoln to Kearny with the noon control at Hastings. The third day's run is back to Omaha by way of Columbus, noon control, and Fremont, the longest day's run.

Quakers Plan Another "Sociability"

PHILADELPHIA, Aug. 15—F. J. Shoyer, chairman of the Ocean Front Association, Ocean City, N. J., has completed arrangements with the Quaker City Motor Club for the latter's sociability run on September 3 from Philadelphia to Ocean City. The run will leave the Hotel Walton, Philadelphia, and end at the Hotel Normandie, Ocean City. Secretary Harbach, of the Q. C. M. C., will issue entry blanks in a day or two and is confident there will be fully 100 cars in line.

Worcester Club's First Track Meet a Success

WORCESTER, MASS., Aug. 15—The first track meet conducted by the Worcester Automobile Club was successfully run off last Thursday. A big crowd was present at the Greendale half-mile course. John P. Coghlin, former president of the club, acted as referee. The summaries:

One-Mile Trial Against Time for Half-Mile Track

No.	Car	Handicap	Driver	Time
1	Benz		Barney Oldfield	1:09 4-5
2	Chalmers 40 (Bluebird)		Louis Strang	1:20 2-5
3	Hupmobile		George Largess	1:56 2-5

Two-Mile Trials Against Time for Half-Mile Track

1	Darracq		Ben Kerscher	2:25 1-5

Two-Mile Stock Chassis, 161 Cubic Inches and Under

1	Hupmobile		George Largess	4:09 4-5
2	Hupmobile		Harry Orrendorf	4:11 3-5

Three-Mile Stock Chassis, 301 to 450 Cubic Inches

1	Chalmers 40		H. C. Grant	4:06 2-5

Five-Mile Stock Chassis, 600 Cubic Inches

1	Knox "60"		Barney Oldfield	6:52 1-5
2	Chalmers 40 (Bluebird)		Louis Strang	6:53 1-5
3	Chalmers 40		Harry Orrendorf	6:54 3-5

Three-Mile, Free-for-All Handicap

1	Chalmers 40	17 seconds	Harry Orrendorf	4:11 3-5
2	Knox 60	Scratch	Barney Oldfield	4:11 4-5
3	Chalmers 40	12 seconds	Louis Strang	4:12 1-5
4	Hupmobile	50 seconds	George Largess	5:02

Three-Mile Handicap, Stock Chassis, 600 Cubic Inches

1	Chalmers 40	40 seconds	Harry Orrendorf	4:50 1-5
2	Chalmers 40 (Bluebird)	35 seconds	Louis Strang	4:50 3-5
3	Knox 60	10 seconds	Barney Oldfield	4:51
4	Hupmobile	70 seconds	George Largess	5:14
5	Darracq*	Scratch	Ben Kerscher	

* Gave up after first mile; engine working badly.

Special Match Event, 3-mile Pursuit Race

1	Chalmers 40 (Bluebird)		Louis Strang	4:06 2-5
2	Chalmers 40		Harry Orrendorf	4:26

More Entries for Vanderbilt Cup

According to W. K. Vanderbilt, Jr., president of the Motor Cups Holding Company, there is a strong probability of thirty starters in the Vanderbilt Cup race this year. Among the latest cars to enter are the Roebling-Planche, a new automobile which has four 7-inch cylinders; two Nationals and a Simplex "50."

Wrong Caption Under the Right Picture

In THE AUTOMOBILE of August 4, in the leading article on the annual meeting of the Society of Automobile Engineers at Detroit, there was printed a picture of the new factory of the Gear Grinding Machine Company in that city, but through some error the wrong caption was placed beneath it. We present herewith a partial view of the company's perfectly equipped plant, confident that none of the many who visited it during the convention could have afterward made a mistake as to the identity of the building, despite the misleading caption.

Factory of the Gear Grinding Machine Company, of Detroit

In the Realm of the Makers

E. M. Benford announces that he will enlarge his spark plug factory on Pearl street, Mount Vernon, N. Y., this fall.

The Peck Motor Car Company, 324-26 No. Delaware street, Indianapolis, announces new lines for the season of 1911. They will handle the "Great Western 40" and the Halladay lines.

The De Luxe Motor Vehicle Company, of Cleveland, was incorporated with a capital of $100,000 to manufacture and sell all kinds of motor vehicles. W. G. Moore and others were the incorporators.

A two-story and basement building will be erected for the Fisk Rubber Company at 2210-12 Farnam street, Omaha, the building to cost $15,000. The Fisk Company takes the structure on a long time lease.

The Gaeth Motor Car Company, of Cleveland, has been incorporated with a capital of $400,000 to manufacture and sell motor-propelled vehicles. The incorporators are George S. Patterson, H. A. Stahl, E. J. Thobader, P. C. Carroll and C. P. Gailey.

The Banker Windshield Company, which has been located for years in the Banker Building at Baum and Beatty streets, East End, Pittsburgh, Pa., has moved to the manufacturing plant at Ellsworth avenue and Summerlea street, now occupied by the Pittsburgh Motor Vehicle Company.

The Valve Seating Tool Company has recently been incorporated in Connecticut for the manufacture and sale of a complete line of portable electric drill and hand valve seating tools. Also a combination tool which both oscillates and rotates, so that it can be used for seating valves or drilling, grinding or polishing and as special equipment is fitted with a flexible shaft for valve seating or drilling in inaccessible places.

E. W. Nicholson, formerly with the Midland Motor Company of Moline, Ill., has accepted a position in the sales department of the H. H. Franklin Mfg. Co., Syracuse, N. Y.

The Chamber of Commerce of Akron has taken up the matter of securing the location of the Akron Selle Company, which proposes to erect a large plant for the manufacture of motor trucks and automobile appliances.

Edward C. and Nicholas W. Rassell, of Toledo have organized the E. C. Rassell Company, and will engage in the manufacture of auto trucks in that city. A site has been chosen at Lagrange street on the Michigan Central Belt. The new concern has a capital stock of $25,000.

A new factory for the manufacture of Stroud carbureters has been installed in the building owned by the Electric Vehicle Company, Minneapolis. Work has been started on orders already placed. Mr. Stroud will soon leave for the East for the purpose of demonstrating the merits of the device and to close for distributing rights.

The Toledo Time Test Tire Company has been incorporated by Eugene H. Winkworth, Frank W. Coughlin, Frank B. Miller, Harry W. Eisenberg and Charles Weirich. It has an authorized capital stock of $10,000. The company will manufacture and inflate pneumatic tires, using a patent process, the invention of a Toledo man.

The Stewart & Clark Manufacturing Company has completed its big new addition to the plant, 110 feet front, three story and basement, and 50,000 square feet floor space, which will increase the facilities, and provide for much larger output. The new plant will have a specially equipped department for the manufacture of the Stewart Standards.

The Sheldon Axle Company of Wilkes-Barre, Pa., has opened offices at 68 East 12th street, Chicago. S. B. Russell will be in charge.

George F. Bishop, of the White Company, has bought a half interest in the New Kensington Motor Company of New Kensington, Pa., and will hereafter be its manager.

W. S. Hathaway, district sales manager of the Maxwell-Briscoe Motor Company in the Southwest, has been appointed general supervisor of all branch houses for the Western district of the United States Motor Company.

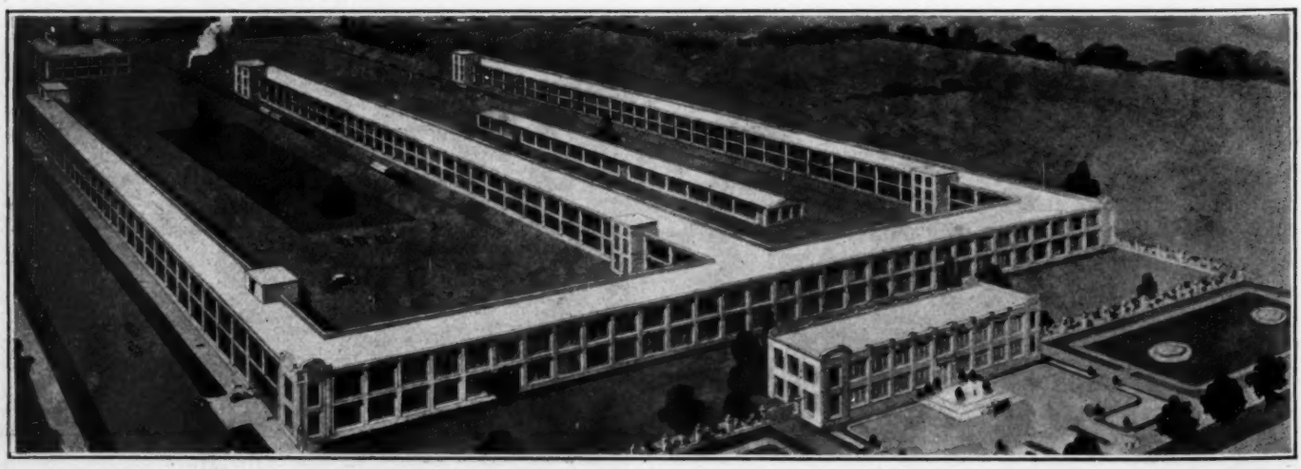
Joseph Tracy, who was appointed on the board of examiners for chauffeurs in the New York City district under the Callan law, has resigned his position. Mr. Tracy said that pressure of other business necessitated this move.

Governor Weeks, of Connecticut, has appointed State Highway Commissioner James H. MacDonald a delegate to the second annual convention of the International Congress of Road Builders at Brussels, Belgium, July 31 to August 10.

Pres. George J. Dunham, of the Royal Tourist Company, and Archie MacLachlan, one of the factory experts, have been visiting the Eastern agencies, spending the greater part of the time in Boston, which was formerly Mr. Dunham's home.

Martin D. Pulcher, purchasing agent and secretary of the Oakland Motor Car Company ever since the company was formed three years ago, has resigned in order to take up the position of general manager of the Bailey Motor Truck Company, in Detroit.

S. H. Humphrey, superintendent of the Brush Runabout Company, has been promoted to factory manager. Mr. Humphrey has been unusually successful in increasing the output of Brush runabouts this year. Before going into the Brush organization he was connected with the Peerless Motor Car Company, of Cleveland.



Bird's-eye view of the new Hudson factory in Detroit, which, including main building, testing building, shipping building, power house and office building, will cost $500,000. It will be completed next month. The buildings are of reinforced concrete and are strictly fire-proof

Agency and Garage News

Charles T. Bowdoin has secured the Pittsburgh agency for the Baker Electric car and is located at the Morewood garage in Centre Avenue.

Joseph A. Henning, who handles the Buick, is having a busy season in his garage and salesrooms, in North Third Avenue, Mount Vernon, N. Y., which he he enlarged this spring.

S. M. Ament, formerly with the Broadway Automobile Company at Seattle, Wash., has joined the force of the M. S. Brigham Motor Car Company in the same city and will sell Cadillac cars.

The ranks of Minneapolis accessory men were increased by one last week when George H. Payne opened offices at 1202 Hennepin Avenue for the distribution of spark plugs and steam vulcanizers. It is his intention to add other lines soon.

The Kissel Kar Company, of Cleveland, was incorporated with an authorized capital of $10,000 to operate a sales agency and repair shop with a garage in Cleveland. The incorporators are E. H. Butt, A. Lezens, E. E. Gott, H. E. Gott and W. B. Davis.

The Automobile and Supply Company, of Akron, was incorporated with a capital of $10,000 by Carl Looker, R. S. Grant, B. Bastian, Amos H. Endeback and J. H. Adams to conduct a general automobile business and to teach people to operate motor cars.

The J. R. Whitney Auto Sales Company of Cleveland was incorporated with an authorized capital of $10,000, to operate a sales agency and garage. The incorporators were J. R. Whitney, W. C. Sell, D. Irene Burke, C. J. Burke and William H. Kemmerling.

N. W. Church, representative of the Stoddard Motor Car Company, reached San Francisco a few days since and will remain there until the Stoddard-Dayton agency change in that territory is settled. He intimates that the company may decide to establish a branch house there.

The Miller Rubber Company of Akron, Ohio, has opened a branch in Detroit, Mich. H. L. Cooper will be in charge.

B. R. Hayden, formerly with the Studebakers at Sacramento, Cal., has accepted a position with the Howard Automobile Company, San Francisco.

G. E. and H. J. Habich Company, Boston, Mass., have been chosen agents for the Hart-Kraft motor trucks and light delivery wagons.

H. E. Smith, proprietor of the Erie Garage at Sheboygan, Wis., has been appointed district agent for the Matheson by Bird-Sykes Co., 1470 Michigan avenue, Chicago, Western representatives.

The Early Motor Car Company of Columbus has taken the Central Ohio agency for the Chase motor truck. The territory covered consists of about 25 counties in the central part of the state.

The Hupp Motor Sales Company, of Cleveland, was incorporated with an authorized capital of $15,000 to conduct a sales agency and repair business. The incorporators are James A. Farrell, William J. Coughlin, Thomas Coughlin, A. C. Ward and W. J. Douley.

J. T. Bill & Co., automobile supply dealers at Los Angeles, who opened a branch store in San Francisco several months ago, are enlarging their stock of accessories, etc., at both stores. The Los Angeles store is now being moved into larger quarters in the same building on Main Street.

John H. Valentine, formerly manager of the Amos-Peirce Automobile Company at Syracuse, has resigned and will enter the automobile business for himself. He has secured the Syracuse agency for the Chalmers cars. He says he will erect a fine garage. For the present he is at 410 West Onondaga Street.

S. G. Chapman reports the arrival of his first shipment of Owen automobiles in San Francisco. Mr. Chapman will look after the interests of the new line in Northern and Central California.

George W. Chandler, of Milwaukee, Wis., has been granted a permit to build a $20,000 garage and stable building at 298-300 Fifth street, Milwaukee. The structure has ground dimensions of 50 by 150 feet and will be three stories high.

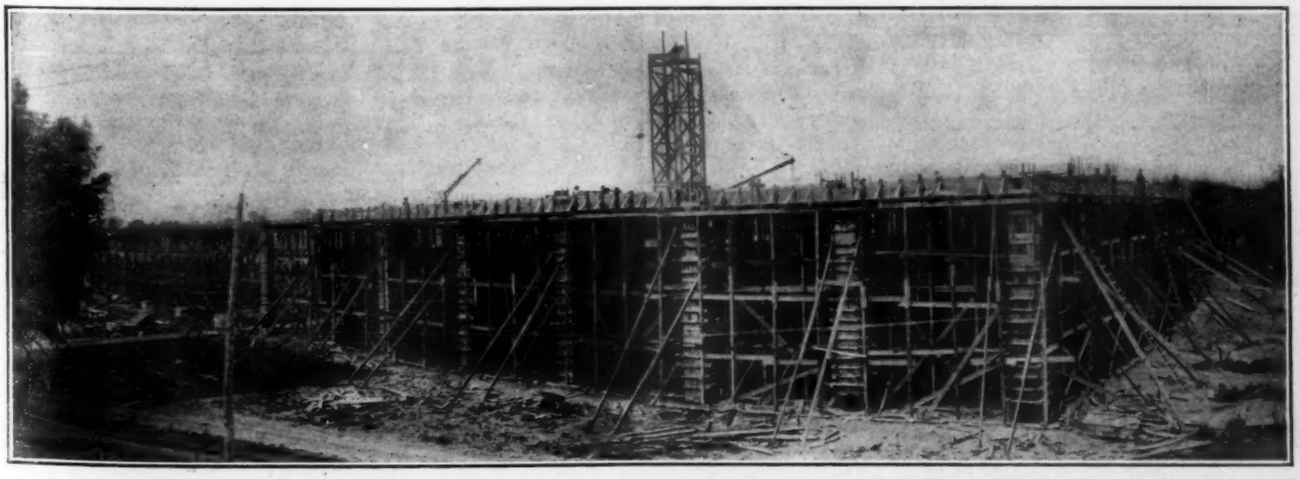
A motor exposition on a small scale, designed to attract the attention of rural visitors, who comprise the bulk of patronage, is to be one of the features of the 1910 Wisconsin State Fair, Sept. 12 to 16.

The Ambridge (Pa.) Auto Company has rented the Jenny Building and opened a first-class garage in that town. The company is composed of John Davie of Ambridge and B. D. McCullough of Tarentum, Pa.

Fire Commissioner Rhinelander Waldo, of New York City, and Commissioner Waldo, First Deputy in Brooklyn, have taken delivery of two 45-horsepower Briarcliff model Lozier cars for use in department work.

The Haines Auto Sales Company, which recently occupied fine new quarters in Los Angeles and which will soon be in its new building in San Francisco, has announced plans for the erection of new buildings at Sacramento and Stockton, Cal., and at Reno, Nevada.

A. G. Williams, who has been associated with the Franklin and C. Arthur Benjamin for several years, has taken a position with the Haynes Automobile Company, of New York, with headquarters in New York, to represent them in New York, New Jersey and New England States, having charge of the wholesale and agency end of the business.

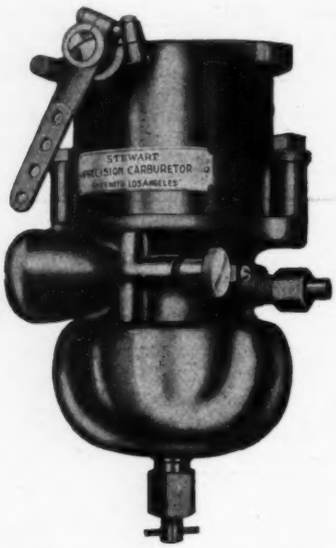


A view of the new reinforced-concrete factory of the Lozier Motor Company in process of erection at Detroit, Mich. Work was commenced on this mammoth plant in May, and it is expected that the factory will be in full operation by October 1st of the present year

Prominent Automobile Accessories

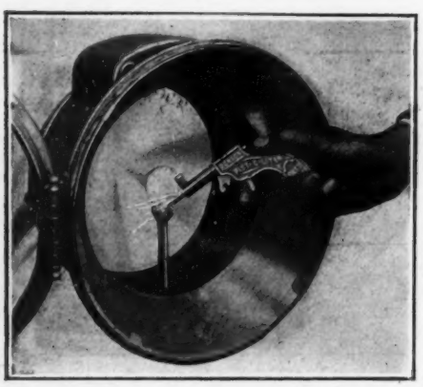
A STURDY CARBURETER

Without springs, and with but one moving part—the air-valve—the Stewart Precision Carbureter, made by the Alfred C. Stewart Machine Works, 1008 Santee street,



Few parts in this carbureter

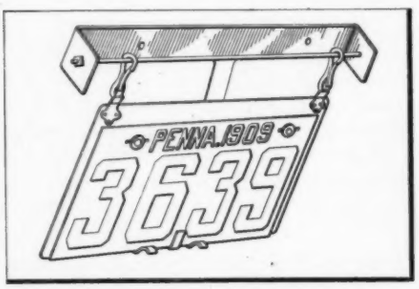
Los Angeles, Cal., is based on a sound principle—the avoidance of fruitful sources of trouble by a reduction to a minimum of the number of component parts. The proportioning of air and gasoline is accomplished by means of gravity acting on the one moving part. No variation in the gasoline level can change the regulation of the mixture. True proportioning and perfect atomizing of the mixture enable the engine to pull strongly and smoothly, and the vacuum is practically the same at all speeds, being due only to the weight of the spraying valve, which is a constant quantity. The principle upon which this carbureter is operated makes it impossible for it to be affected beyond the minimum by variations of altitude, trips to 7000 feet having been made without adjustment being necessary to produce a well-proportioned mixture.



Handy for a windy night

MATCH THAT RESEMBLES A GUN

Lighting-up time on a windy night—even if one hasn't forgotten the matches—is a period of much exasperation and no little profanity. Possibly with a view to conserving the future spiritual prospects of its clientéle, but anyhow with an eye open to the positive demands of the present, from the viewpoint of the autoist, the Ronson Specialty Company, 7-15 Mulberry Street, Newark, N. J., has patented and is marketing the Ronson Pist-o-Liter, a device with which it is possible to positively ignite the gas flowing from an acetylene lamp burner, under any and all conditions of wind and weather. It is shaped like a small revolver, and pressure upon the trigger produces an active series of sparks, which will ignite immediately any inflammable gas, which makes the device a handy thing to have around the house as well as in one's car. After discharging, pressure upon the plunger in front of the trigger re-engages the latter for the next "shot." When, after constant use, the sparks become fewer, one



Saves trouble at Inter-State ferries

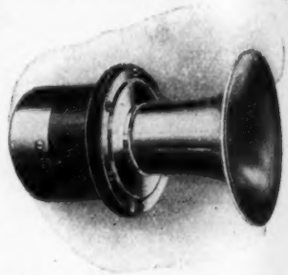
or two turns to the sighter cap should be given, to tighten it. At intervals it is also necessary to remove the cap and change the position of the flint, to insure a full series of sparks.

AN AID TO CLEAN GASOLINE

Water and sediment in gasoline are troublemakers for the autoist, and any device which will do away with this evil entirely will be hailed as an unmixed blessing by the motoring fraternity. The Liggett Spring & Axle Company, Park Building, Pittsburg, Pa., after much experimenting, has perfected a gasoline separator for which many claims of excellence are made. Even the highest grade of gasoline contains foreign substances, and the sweating of the tank due to atmospheric conditions frequently adds water to the gasoline, and then comes the trouble of testing batteries, etc., in the effort to locate the trouble. It is claimed for the Liggett Separator that it prevents everything but gas-making fluid from getting into the carbureter. All foreign matter stops at the diaphragm, and is drained off through a petcock.

SMALL, POWERFUL ELECTRIC HORN

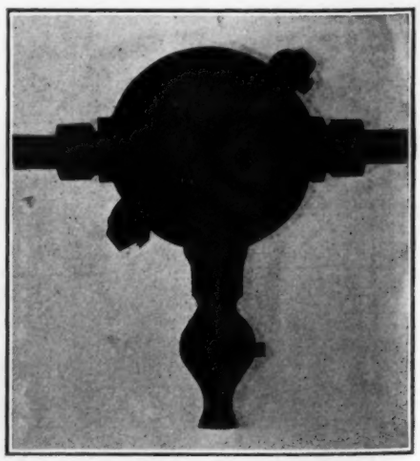
To meet the demand for an electric horn which combines a powerful tone with substantial construction and pleasing appearance at a reasonable cost, the Atwater Kent Mfg. Works, 45 North Sixth street, Phila., has produced the type D Monoplex. It has an improved vibrating system, which is louder and heavier in tone than the one formerly used. Another feature is the one-piece polished brass horn in which there are no soldered seams. This horn is thoroughly substantial and efficient, and may be used on large cars for city use, or on the average car for general use. It consumes little current and gives best results on six dry cells or an eight-volt storage battery. It is small in size only and does not cheapen the appearance of the car on which it is installed.



Small, but far-reaching horn

HANDY REVERSIBLE TAG HOLDER

Little troubles are often the most annoying, mainly for the reason that they are seldom guarded against. The Schell Reversible License Tag Holder, for which a patent has been asked by the Northern Machine Company, Twentieth and Dauphin streets, Philadelphia, will neutralize in large measure the annoyance and delay occasioned at inter-state ferries or boundary lines when the motorist must change his tags in accordance with the laws of the commonwealth he is about to enter. This holder consists of a frame to either side of which a tag can be fastened. The frame itself swings by a pair of spring snaps.



Takes dirt and water out of gasoline